Whose Money Is It?

THE President has asked for unprecedented taxes for defense purposes. No one would want to shirk on the cost of making this country strong. No one has raised his voice on this score. From the farm to the city, from the home to the office, all have applauded the desire to make this country so strong we can't suffer defeat. We believe in pay-as-we-go.

So far so good. But just raising taxes and spending money is not the whole answer. The way the budget has been presented and the lack of a real honest effort to cut down non-defense spending has jolted many people. It would jolt many more to action—if they realized who pays the bill.

There has been some effort by our government to cut down on its spending —but it has been small potatoes (not the expensive kind the government buys). There is evidence that no attempt has been made by the Administration—nor will one be made—to realistically cut down regular government spending. We still have federal aid to education in tremendous sums. Maybe we do need aid for education, but we need an impartial committee study to see where some of this money goes and what good it does.

We have new-fangled ideas on socialized medicine despite the experience in England. If they are pushed through they will cost billions. Now is the time to keep them from mushrooming. Sooner or later the farm support program may drive housewives to revolt. A subsidy for farm prices, supported by a tax on the people who must pay higher prices because of this rigmarole is something close to insanity.

We have the government going further and further into the public power business when private power concerns can do a much better job. Some of these things may be only a drop in the bucket. But there are so many drops that they add up to gallons.

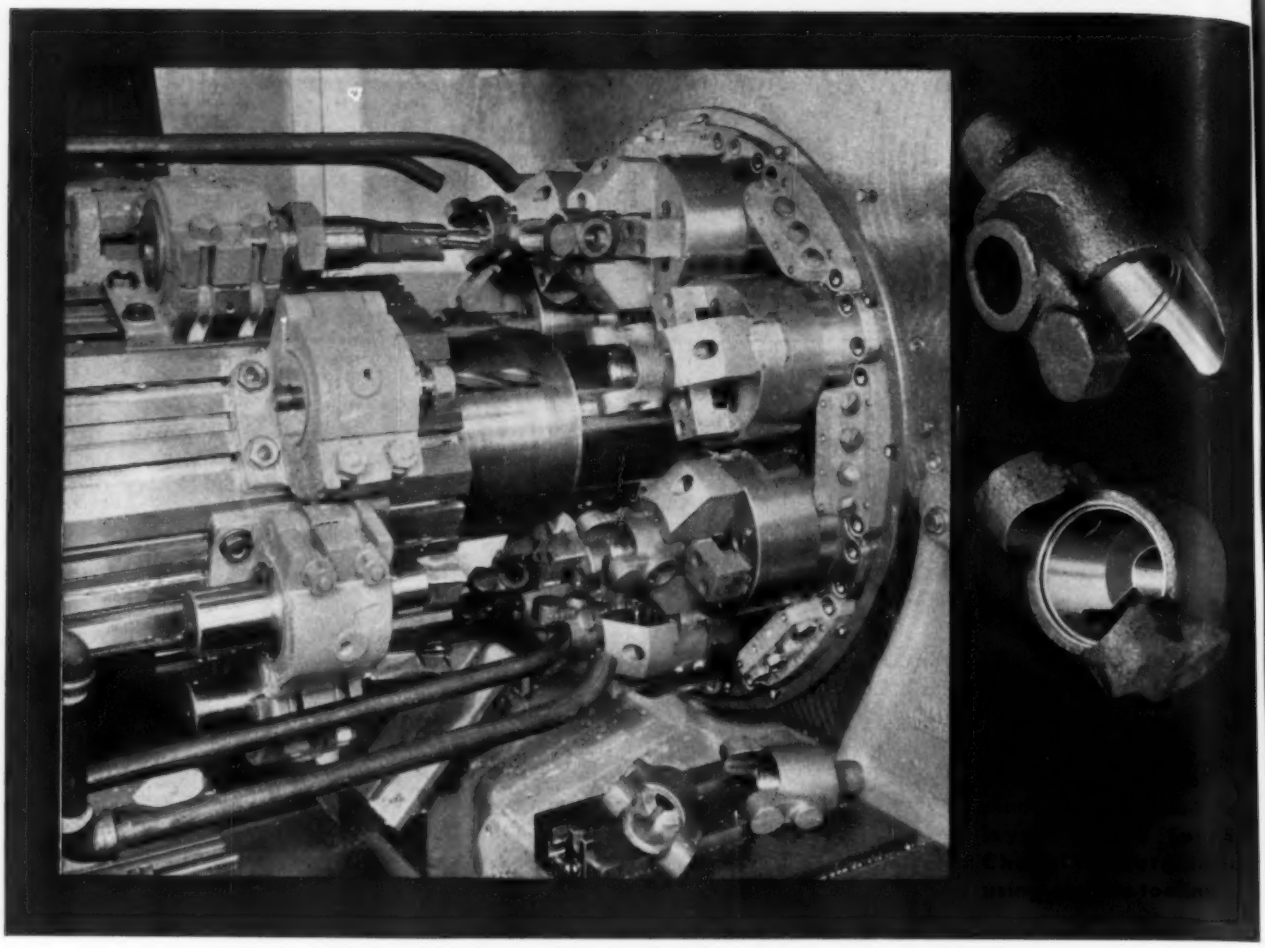
Some Congressmen log roll and will vote for anything if they can get something for their own community. That something can wait. Some businesses put pressure on for this or that when it can wait or be eliminated. Government is pressured for all sorts of things by many of us but no one wants to restrain himself.

When we finally realize that "The Government" is only a collection of all of us and that our own money is going down the drain maybe things will be different.

When we see what the taxes do to our bankroll—if any—and to incentive—if any remains—maybe each of us will demand a cut-to-the-bone in government services which have no bearing on defense, which are socialistic in nature and which in themselves are a danger to the very freedom we are fighting to protect.

Tom Campbell

Editor



HOLD HIGH CONCENTRICITY on high-speed interrupted cuts

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Here's more proof that an Acme-Gridley's basic design advantages pay off in the ability to take it—on the toughest kind of tricky jobs—up to the limitations of modern carbide tooling speeds.

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Adaptability is another important advantage of Acme-Gridleys; they'll handle a wide variety of tooling (including independent power-driven auxiliaries where needed). That way, better distribution of cuts or the combining of operations can cut machining and handling times.

All these features add up to give you "more good pieces in the pan," more tough production problems licked. Get the full story on these time-saving, money-saving Acme-Gridley 4, 6 and 8 spindle Chucking Automatics—ask for Bulletin CM 51.

JOB FACTS

PART—Hydraulic Lift Box

MATERIAL—1035 Steel Casting

MACHINE—Acme-Gridley 6″ RPA-8 Spindle Chucking Automatic

TOOLING—Carbide

TOLERANCES—.003″ on Large Hole; .001″ on Small Hole

MACHINING TIME—15 Seconds (240/hr.)

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IRON AGE *newsfront*

news methods and product forecast

► A great many of the machines which are now coming out of government reserves require extensive rebuilding to put them in like-new condition. Cost is often as high as 60 pct of current new machine cost--which is often higher than the original cost of the machine being rebuilt.

► Nickel is now selling in the black market for $3.00 a pound, up a dollar from the last reported quotation. Even at this price it is very hard to find. One of the ways nickel gets into the black market involves no cash: A legitimate user turns over his regular approved shipment to a dealer who pays for it with twice as much equally usable scrap.

► Because of the FTC ban on basing point selling of steel the government is paying various prices for its steel, depending on the producing point. This should please the theoretical economists. What they may not realize is that the basing point ban is costing the government (like other consumers) more money because most producers follow their usual practice of selling f.o.b. mill with no freight absorption.

► As much as 50 pct of the pig iron being bought by some midwestern foundries is imported.

► The automobile industry can't move far these days without running into a material restriction. A GM Saginaw steering gear uses 15 different materials. In it there are 18 different kinds of steel. The Delco-Remy Div. has a slightly different problem: Last year it used 42,000 baby nipples to mask the terminals of automobile starting motors during painting.

► Use of approved packaging entitles shippers to rate reductions on the French railways. One test in which packages are rotated in a spiked barrel is called "the brutal manipulation."

► If present experimental applications of iron powder in projectiles are adopted, the domestic iron powder capacity would have to be expended tremendously--some conservative estimates say by at least 10 times if foreign sources are ruled out of strategic planning.

This would put the U. S. about where Germany was in 1944, when the Nazi's iron powder output topped 32,000 tons to meet demands of their shell rotating band production.

► Inspection of internal tolerances of assembled parts can now be done with a betatron without having to tear down the assembly for measurements. Entire engines for military vehicles have been inspected in this way.

► One of the new uses for metal powders is for turbine buckets for the hot end of a jet engine. Pressed iron powder blades have been used in the compressor section. But now one of the new metal alloys is being tested for the high temperature application.

► Radially fed gear shaving, long thought impractical, is being successfully used in Detroit on internal gears. The cutter does not reciprocate; the gear feeds radially into it. Production is twice that of an ordinary gear shaver.

► A Chicago steel warehouse is planning to install a rolling mill. They expect to have it finished by the middle of this year.

Christendom was saved by steel

ALL day long, waves of Arab horsemen beat upon the ranks of Charles Martel's veteran militia. But time after time, the enemy cavalry recoiled before storms of iron-tipped javelins, their shining scimitars unsuccessful. On the second morning, the Saracen leader, Abderrahman, was slain, pierced with many spears. The Moslem horde fled back across the Pyrenees, never again to menace the Western world.

Time after time, as at Tours in 732 A.D., Christian civilization has been threatened by seemingly invincible enemies. Yet history proves that victory invariably has gone to the nation or alliance which excelled in the production and use of iron and steel.

In the present era of alarms and crises, it is reassuring to realize that America has greater capacity for making steel than all the rest of the world combined. Furthermore, the American steel industry is expanding at a rate far faster than that of all the dictator-directed economies behind the Iron Curtain. Our free and independent steel making and metal working industries can and will forge sinews for the peace we want or for the war we may be forced to fight.

So remember this: It is not only the threat of Muscovy to fear—America has itself to fear also—its misguided sentimentalists, its sheltered saboteurs—who seem to play communism's game by frittering away our strength and our resources.

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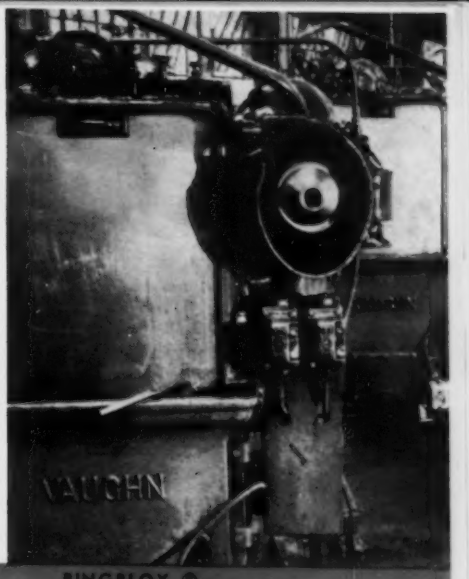

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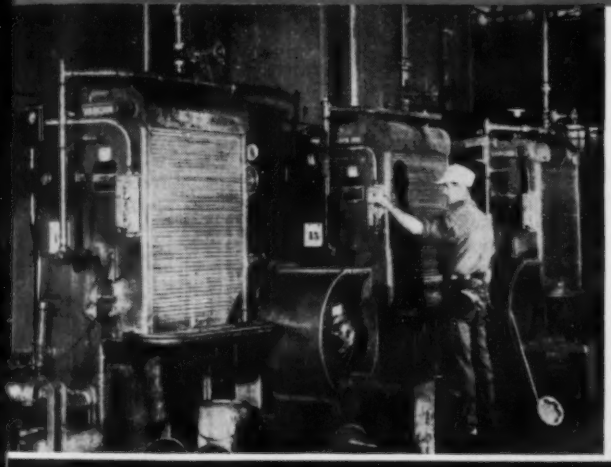

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Dear EDITOR

letters from readers

Shares Views

Sir:

I read your editorial in the Jan. 25 issue and I agree that all of us can very well make some sacrifices in our standard of living in view of the world situation. Everybody would agree to this—BUT people would tell you that they don't believe in making sacrifices in their standard of living when the Government in Washington believes in raising its standard of living day by day. Why should people out in the country believe they should get leaner and leaner when the Government at Washington believes in getting fatter and fatter? Has the Government made one single gesture of economy as an example?

E. M. KEAYS
Robert W. Baird & Co.
Milwaukee

Typical Reaction

Sir:

Enclosed is two bucks for another copy of your annual. Your annual issue is one which everyone interested in the steel industry will want to keep for its source material. That statistical section was a marvelous job, and everybody connected with the magazine is entitled to congrats.

W. K. GUTMAN
Goodbody & Co.
New York

Plenty of Interest Now

Sir:

I will greatly appreciate your sending me tearsheets for the articles on p. 66 in THE IRON AGE of Dec. 28, 1950 on continuous casting, and the issue of Dec. 22, 1949, p. 59. I have been informed that THE IRON AGE also published a very excellent article on the subject in the Feb. 24, 1944 issue. I believe that it would be a real contribution to the national emergency, if the articles were reprinted, what with the coming steel shortages. Interest in continuous casting will be stimulated as a result of plant expansion and the scramble for metals in the future.

J. R. HYNES
White Plains, N. Y.

We don't have to stimulate interest in continuous casting, as there has been a very active program by many companies during the past year. The Jan. 25 issue covers the latest Hazelett continuous casting mill, and the first disclosure of an aluminum bar casting machine appears on p. 87 of this issue.—Ed.

The Changing Times

Sir:

In the past, we were very much under the impression that practically all warehouses had established the same quantity extras. Also, the mills all had about the same quantity extras. Any difference in price usually was reflected in the warehouse base price and the mill base price.

Today, according to prices we have received, it seems that the various warehouses have different quantity extras as well as different base prices, the same thing holding true for the mills. Would you be so good as to check us on this and let us know whether we are or are not correct.

H. B. STAMM
Purchasing Agent
Columbia Mills, Inc.
Syracuse, N. Y.

About 10 years ago, the warehouses in each region of the country generally had similar base quantities and extras. It has been common to find regional similarities in pricing practices since. These are reflected in the footnote to the warehouse prices published weekly in THE IRON AGE. However, the pressure of the current situation has resulted in variations in mill extras, with variations from mill to mill. Quite probably, these are reflected in the actions of individual warehouses, depending upon the mill from which each receives the bulk of his stock.—Ed.

Credit Original Author

Sir:

I was amazed in reading the article "Germans Make Pig Iron without Coking Coal" by a B. M. Pearson, on p. 71 of the Jan. 11 number of THE IRON AGE, to find that it contained no reference whatsoever to the original article by Dr. Fritz Jaeger of which Pearson's article is but a somewhat condensed translation. This article appeared in "Stahl und Eisen," Aug. 3, 1950 . . .

G. LETENDRE
Director
Dept. of Mines & Metallurgy
Universite Laval
Quebec, Canada

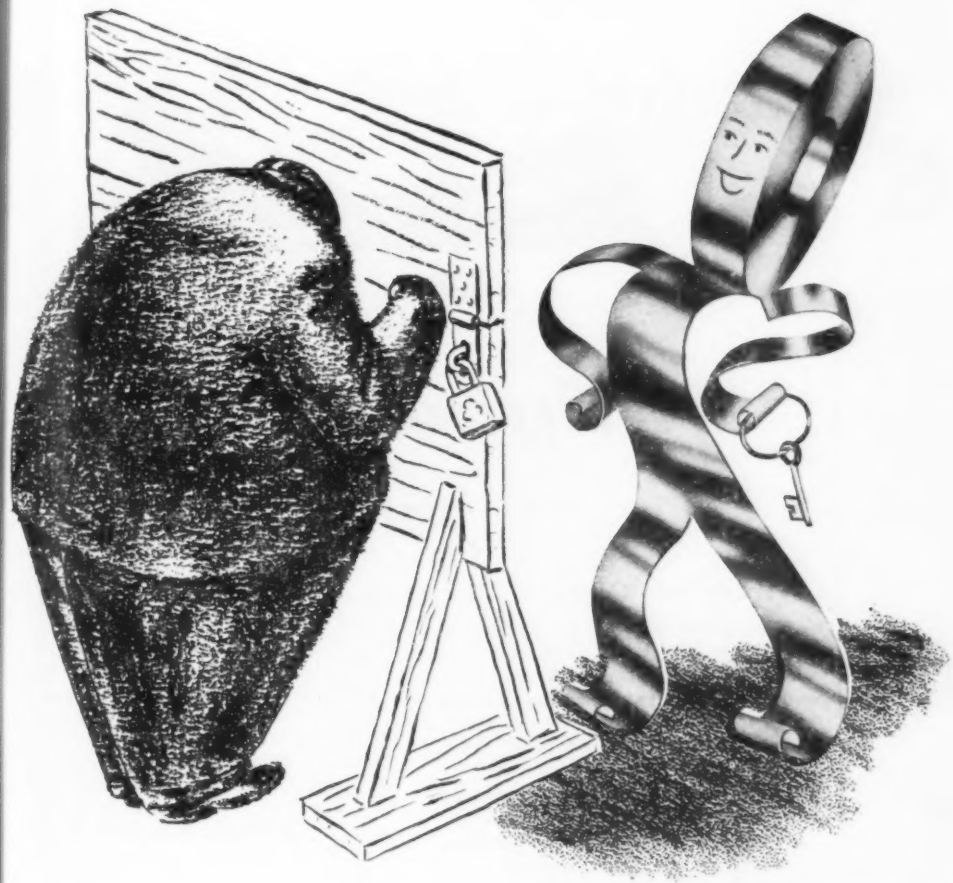
THE IRON AGE regrets exceedingly the oversight which permitted this condensed translation to appear without credit to the author and to "Stahl und Eisen." The same apology is due on the forsterite lining article (Jan. 18, p. 65) which was also translated and abstracted by Mr. Pearson. On the latter, Mr. Pearson indicated "Stahl und Eisen" as his reference; we failed to realize it was a translation from that magazine.—Ed.

Kudos

Sir:

This is just a short note to express our very sincere appreciation of the fine treatment you gave R. B. Smith's article on codification of light metals in your Jan. 25 issue. Everyone here is very pleased with your handling of this material—especially the large 3½-p. chart, which is really a "dilly."

G. W. BIRDSALL
Mgr., Editorial Dept.
Reynolds Metals Co.
Richmond, Va.



IS MR. O. V. IN YOUR STOCK?

Perhaps you feel that any kind of cold rolled strip steel in your inventory is better than none. We agree that in times of critical shortages this may sometimes be true. But OVERSIZE VARIATION in strip thickness, a not uncommon characteristic in some strip and/or slit-sheet products can materially reduce your productive yield per ton—is a hidden cost that increases your steel bill. Best way to control Mr. O. V., locked in a stock permanently, is to specify, when deliveries are possible, Thinsteel precision cold rolled strip in low carbon, high carbon (annealed or tempered) and stainless grades. Thinsteel assures you extreme accuracy to gauge and uniformity of all characteristics in coil after coil - - means more feet per pound, more finished parts per ton.

CMP's expansion program, which includes new rolling facilities and auxiliary equipment, is under way and will help to provide, during 1951, additional capacity to meet increasing demand for Thinsteel products.

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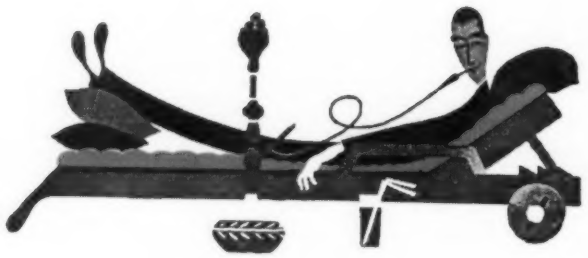

Fatigue Cracks

by Charles T. Post

Welcome Price Control

It's nice to be able to report that at least *somebody* likes the new scrap price ceilings. From early reports, it appears that the nation's police held a celebration the likes of which has not been seen since VJ-day.

Soaring scrap prices had created too much temptation for certain gentry possessed with trucks, hoists, and not too many scruples. Take the case of the Portland, Ore., heating equipment dealer who woke up one night to see a 600-lb boiler being hoisted onto a truck from his equipment lot across the street. Before he could get his trousers on, the thieves had taken off. Then there was the logging operator who towed his rig into the deep woods and left it preparatory to beginning operations the next day. The minute he left, someone popped out from behind the nearest fir tree and towed it into the still deeper woods for cutting up into No. 1 Machinery Cast.

With agricultural scrap at $60, the farmer who reported that someone had sawed the wooden handles off his plow and stolen the blade should not have been too surprised. Fifty years ago, the plow would have been ignored and the horse taken.

Now, with ceiling prices, the incentive will be to turn scrap into finished products again. If you have an open hearth furnace in the back lot, you had better keep your eye on it.

Or, as the sign in the clip joint said, "Keep your eye on your wife; to heck with your coat."

Back Copies Wanted

Ziegler Sargent, v.p. of Sargent & Co., the builders' hardware firm, dropped in the other day to find out if we had the back issues of your f.f.j. he wanted. In 1864, his firm supplemented its product advertising with "Help Wanted" ads designed to attract immigrant labor to its new plant in New Haven. Until Sept. 22 of that year, your f.f.j. was known as the *Hardware Reporter & Iron and Steel Mfrs. Circular;* then, as *The Iron Age and Hardware, Iron & Industry Reporter.* If you happen to have any of these issues containing the "Help Wanted" ads, please let us know.

Puzzlers

Apparently some of your f.f.j.'s readers are just getting caught up on their reading. L. F. Scana, North American Aviation has just come through with the right answer to the "walking man" puzzle and C. M. Williamson, Sears, Roebuck & Co., recognized that the diameter of the circle was 15 in.

T. W. White and D. A. Lieberman, Ther Electric & Machine Works find that they can just squeeze a well-oiled ball bearing of 0.4615-in. radius through the hole in the Jan. 25 puzzle. First one in with the correct answer of 6.43008 in. to the steel and cork sphere problem is C. E. Norton, Chicago.

For this week's puzzle, H. K. Moore, Boston, wants us to find the correct numerical values for the various letters in the denominator and quotient below. Note: "O" refers to the letter "O" and not zero.

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                S T U F F
H O T | 1 F 8 T H 9 F U
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machine tool high spots

sales inquiries and production

by W.A.Lloyd

Capitol Skull Session — First pool orders will probably go to builders of vertical and horizontal boring mills and planer-type milling machines, it was indicated this week.

Representatives of the boring machine industry met with NPA officials in Washington to review immediate and future needs for vertical and horizontal boring mills and the planer-type milling machines and the ability of the industry to meet those needs.

Forceful Pressure—NPA officials said that as the mobilization program gains momentum there will be increasingly heavy demands on the industry to provide boring machines of all types needed before manufacturers can tool up for military production.

NPA officials are now considering issuing "pool" orders to help speed the building of these machine tools. They emphasized that the primary purpose of pool orders is to enable the machine tool manufacturers to make orderly advance scheduling of their full production for defense, and to assure them that they will get the materials they need, when they need them. Such a program was put into effect during World War II.

Expansion Help — Industry spokesmen said they are now booked far ahead for some types of boring machines. In order to facilitate expansion of present facilities in certain parts of the industry, certificates of necessity may be requested to help firms charge off depreciation at an accelerated rate. In some cases, direct government loans may be required, they said.

Staffing Extra Shifts—Industry representatives said they are having trouble getting the manpower for extra shifts and in getting castings for boring machines, particularly castings of the machine tool grade.

NPA officials said they would aid wherever possible in placing defense orders for castings, and urged the industry to assist in locating idle boring mills in plants in their localities.

Press Output Increase—Lake Erie Engineering Corp., a major producer of presses, is spending $1 million for new machine tools to increase capacity of its Kenmore, N. Y. (near Buffalo) plant 30 pct. Robert E. Dillon, president, said his company "probably" would increase the physical size of the plant.

Meanwhile, builders of all types of machine tools are bending their effort to step up production. In the East, a major manufacturer of elevators will reportedly produce certain assemblies and possibly complete machines for one company. In the Midwest, a manufacturer of printing machinery, will produce lathes.

Bottleneck Stigma—The industry is battling to forestall a bottleneck brand, which would be as ridiculous factually as it would be unfortunate public relations-wise.

Facts are that the industry is swamped with orders. Best estimates of machine tool demand indicate that it will reach a peak, possibly $1.3 billion this year, and taper off gradually. But with some companies already quoting deliveries on some machines for first quarter of 1953, the situation is obviously something less than fluid.

Automatic Handling—In Cleveland, the automatic handling, feeding and unloading of materials between machining processes, is a must in industry today, W. R. Slattery, of the manufacturing engineering staff of Ford Motor Co. told 300 engineers at the eighth annual machine design conference, at Cleveland Engineering Society here.

He described the function of automation, a mass production method soon to be in operation at Ford's engine plant and foundry here.

FREE *publications*

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Cold Sawing Machines

Heavy duty models of the Ohler hydraulic high-speed cold sawing machines are described in a new 4-p. bulletin listing complete specifications. Features of the equipment that result in greater efficiency at lower cost are detailed, along with information on cooling, ease of operation, the hydraulic system, and cutting speeds. The model 1500 automatic saw sharpening machine, providing accurate grinding and equal height to each tooth, is also described. *Klingelhofer Machine Tool Co.*

For free copy insert No. 1 on postcard.

Plant Safety Kit

The Towmotor plant safety kit contains 4 big plant markers measuring 14 x 22 in. for marking off lift truck routes, and 4 safety posters for display on bulletin boards. The latter are humorously illustrated with attention-getting cartoons emphasizing 4 major causes of accidents, and the heavy cardboard markers have bold black lettering on a yellow background. Also included are 2 operator guides showing how to get maximum service from efficient Towmotor operation, and how to lift, transport and stack all types of products. This practical kit should aid materially in reducing plant accidents and promoting safer materials handling. *Towmotor Corp.*

For free copy insert No. 2 on postcard.

Metal Turnings Crusher

Reasons for crushed turnings are listed in a new 8-p. booklet describing American ring turnings crushers, designed especially for shredding long curly turnings of low or high carbon steel, alloy steel, aluminum, brass or bronze as produced by automatic screw machines, lathes and planers. Design and construction features are detailed and information is given on approximate capacities, speeds and power. A clearance and foundation plan is shown, along with photos and descriptions of various installations. *American Pulverizer Co.*

For free copy insert No. 3 on postcard.

Exhaust and Dust Collector

Advantages of employing the unit system of dust collection are discussed in a new 14-p. bulletin describing dust exhauster and collector units. Some of the outstanding features of 1100-cfm units are covered, and complete specifications are listed. Performance curves are shown, along with typical arrangements of unit systems and information on suggested volumes and pipe sizes. Essential information for ordering units from this British company is explained. The booklet also lists prices for the various 3-phase, single-phase and dc models. *Keith Blackman Ltd.*

For free copy insert No. 4 on postcard.

Metal Protectives

A new 4-p. bulletin on Protect-O-Metal weld spatter preventives and metal protection compounds supplies full details on composition, application, and potential savings provided by the three grades. In addition to describing spatter-proofing properties, the folder tells how compound No. 8 provides corrosion protection for long periods—of special value to manufacturers and fabricators who may store metal stock, semi-finished materials and dies out-of-doors prior to welding operations. *G. W. Smith & Sons, Inc.*

For free copy insert No. 5 on postcard.

Aluminum-Coated Steel

Aluminized steel — steel with a special coating of aluminum—is discussed in a new 24-p. booklet describing the steel's aluminum surface, its heat and corrosion resistance and outstanding heat reflectivity—80 pct up to 900°F. Photographs and a listing of applications show where manufacturers have used Aluminized in a wide variety of products. Also included are data on mechanical and forming properties, available sizes and gages, as well as detailed recommendations for welding by various methods, brazing and finishing. *Armco Steel Corp.*

For free copy insert No. 6 on postcard.

For Resurfacing Floors

Plastic Rock, a floor resurfacing material composed of siloxide rock, asphaltic paste and setting powder, is described in a new 4-p. bulletin telling how this material, when combined with water, forms a mortar-like mixture which is troweled the same as concrete. The bulletin illustrates typical applications and gives information on physical characteristics and uses. The folder explains how more than 53 million sq ft presently in use have stood the test of time. *United Laboratories, Inc.*

For free copy insert No. 7 on postcard.

Mill Motors and Controls

Westinghouse 600-Series mill motors and Class 9500 dc magnetic mill auxiliary controllers are described in a new 20-p. booklet. Design features and construction details of the mill motors are discussed. The booklet points out that the motors are built to meet the AISE specifications. The new mag-

Turn to page 126

NEW *production ideas*

new and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard.

Spiral Milling Attachment

Designed for larger machines—No. 3 dial to No. 6 dual power dial types.

The new Cincinnati heavy duty universal spiral milling attachment is driven from the machine spindle. It has 360° swivel range in two planes, offering the versatility of smaller attachments. To obtain utmost rigidity, the primary bracket is clamped to the face of the column and also to the front end of the Dynapoise overarm. Outboard supports for extra heavy milling operations may be obtained as an extra. Spindle and all shafts are mounted on anti-friction bearings; the spindle nose conforms to No. 50 standard. *Cincinnati Milling & Grinding Machines, Inc.*

For more data insert No. 14 on postcard.

Chromated Anti-Rust Paint

Can be applied right over rust without wire brushing or scraping.

Known as Rustrem Chromate Special, the new paint is available in clear, black and aluminum. It possesses all the penetrating and sealing qualities of standard Rustrem and stands up under extreme conditions of temperature and moisture. It is suitable for interior and exterior use. *Speco, Inc.*

For more data insert No. 15 on postcard.

Large Diameter Cylinders

For heavy production machinery; 15, 30 and 195 tons lifting power.

A 20-in. diam model air cylinder produces over 30 tons of lifting power at rated operating pressure of 200 psi. Cylinders are the counterbalance type, adaptable for use on presses and other heavy production machinery, and available also in 18, 16, 14, 12, 10 and 8-in. bores. At its rated 2500 psi operation under shock load conditions, the 12-in. bore model high pressure hydraulic cylinder produces 140 tons of thrust, and in non-shock load conditions, produces over 195 tons of thrust at 3500 psi operation. Cylinders have non-breakable solid steel heads, caps, and mountings, scratch-resistant, hard chrome plated piston rods, piston rod dirt wipers, precision-honed barrels of 15 microinch finish, and self-regulating, wear compensating, leakproof and tamper-proof seals. Non-corrosive brass barrels eliminate rust from air moisture. *Miller Motor Co.*

For more data insert No. 16 on postcard.

Industrial Trailers

Of welded, heavy gage steel; for heavy hauling; singly or in tandem.

Three models are available with a fifth wheel at both ends or at one end only. All wheels are Timken roller bearing equipped. A 5-ton capacity trailer with 16-in. diam pneumatic-tired wheels for floor and load protection has a clearance of 40½ in. and stake pockets for use when side or end stakes are required. Model TF-100 has solid rubber tires, stands less than 23 in. high, and has four stake holes on each side. A 15-ton capacity for

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(Sec. 34.9 P.L.&R.)
New York, N. Y.

BUSINESS REPLY CARD
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THE IRON AGE
100 E. 42nd St.
NEW YORK 17, N. Y.

production ideas

Continued

heaviest industrial hauling has an overall height of less than 24 in. It has dual solid rubber-tired wheels and a removable stake near each corner. *Phillips Mine & Mill Supply Co.*

For more data insert No. 17 on postcard.

Rust Resisting Finish

Atomite provides deep black finish for carbon and low chrome steels.

Atomite processing, an immersion treatment using no current, gives a gloss black on smooth surfaces or a non-reflecting dull mat finish on etched or sand-blasted surfaces. Atomite will not affect heat treated parts and reportedly remains deep black at 1000°F. It is oil absorptive; aids lubrication. The process requires no expensive equipment. It is recommended for use in place of zinc or cadmium on steel. *Atomite Black Co.*

For more data insert No. 18 on postcard.

Fusible Panelboard

With toggle switches for lighting-appliance branch circuit control.

The new NTPR panelboards are available with 4 to 40 circuits for use on ac or dc applications. They carry the approval and label of the Underwriters' Laboratories, Inc. Construction features embody a 17 in. wide x 4¼ in. deep box with 4-in. wide wiring gutters. *Square D Co.*

For more data insert No. 19 on postcard.

DC Power Supplies

Metal-enclosed; utilize selenium rectifier stacks; reliable control.

Applicable wherever dc power is required, the new conversion equipment may be used for excitation of synchronous motors; operation of dc elevators, cranes and machine tools; and for conversion of ac feeders to dc. The rectifier units are mounted in a metal casing consisting of one to four separate sections, mounted vertically, one on top of the other, and bolted together. The units supply either 125 or 250 v dc from a 208, 230 or 460 v, three phase, 60 cycle ac supply. Convection-cooled and fan-cooled units are available. Under proper operating conditions, the efficiency is said to run as high as 81 to 84 pct, with power factor of 95. *General Electric Co.*

For more data insert No. 20 on postcard.

Air Compressor

400 cycle ac, designed for positive operation at 50,000 ft altitudes.

The pump is equipped with an ac motor of 1/5 hp, 115 v, 400 cycle, single phase, 4 amp, 7200 rpm. The minimum capacity at 50,000 ft is 80 cu in. per min while maintaining 32 in. Hg absolute pressure. Sea level capacity is 1750 cu in. free air per min. Principal use is the pressurizing of radar installations in aircraft, maintaining atmosphere of dry, oil-free air. Unit has a service life of 1000 hr. *Lear, Inc., Romec Div.*

For more data insert No. 21 on postcard.

Adjustable Micrometer

One does work of 12 or 24.

A V-notch adjustable micrometer that can be set and read with speed and accuracy, has a series of 12 or 24 V-shaped notches spaced 1-in. apart in a tool steel blade. A carrier, sliding on the blade and holding a standard 1-in. micrometer head, is positioned in the desired notch and locked in place by a spring clamp. The 1-in. distance between notches is divided into 0.001 in. by the micrometer head. Adding the micrometer head reading to the V-notch number is all the reading required. Available in 12 and 24-in. length ranges, with a 12-24-in. micrometer. *Lester Micrometer Co.*

For more data insert No. 22 on postcard.

Plating Brighteners

Exceptional brilliance, uniformity and high covering power claimed.

Manufacturers who must change plating specifications from critical chromium, nickel and copper can attain exceptional brilliance with new cadmium and zinc brighteners, it is reported. Cadmium brightener is available as a liquid or powder additive. Because barrel solutions may be operated at high temperatures (up to 105°F) maximum production is maintained. Wide latitude of operable concentration range

use postcard below

2/22/51

Name .....
Title .....
Company .....
Co. Address .....
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THE IRON AGE, New York 17

☐ Fill in above the number of the item on which you need further data.

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THE IRON AGE, New York 17

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THE IRON AGE, New York 17

☐ Fill in above the number of the item on which you need further data.

Let's face it . . . every day the tempo of American industrial production accelerates to keep pace with a program of increasing national preparedness. Here at Monarch we are ready to serve industry and government requirements with a background of over 37 years of casting experience.

HERE'S WHAT MONARCH OFFERS

. . . 300,000 square feet of manufacturing area devoted entirely to the production of ★ Aluminum Permanent Mold Castings ★ Aluminum Die Castings ★ Zinc Die Castings.

. . . Monarch pioneered in the development of aluminum permanent mold castings and today offers the most modern permanent mold production methods.

. . . Monarch also offers a modern die casting division devoted exclusively to precision casting of aluminum and zinc.

. . . Monarch coordinates the production of both permanent mold and die castings under the supervision of two completely staffed engineering departments to assure sound, economical casting design.

. . . Monarch uses complete physical and metallurgical laboratory facilities to maintain highest quality control methods and inspection standards.

. . . Monarch services include finishing and assembly operations for individual permanent mold and die castings or complete product assembly.

. . . Monarch offers modern, company-owned toolroom, maintenance and warehousing facilities within a plant that is strategically located for rail, air or truck shipment.

Here at Monarch we welcome the opportunity to work with you in giving the widest possible casting service, utilizing the full scope of our unique casting facilities.

NOTE: This advertisement forms the nucleus of an interesting folder giving the complete story of Monarch's facilities. We will forward this folder upon request.

MONARCH ALUMINUM MFG. COMPANY • *Detroit Avenue at W. 93rd Street • Cleveland 2, Ohio*

publications

Continued

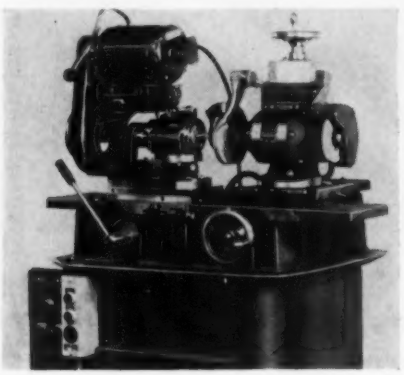
provides ease of control. Barrel and still zinc brighteners, available as liquid additives, are readily controlled by visual inspection of deposits. All give deposits of exceptional brilliance, uniformity and high covering power. *R. O. Hull & Co., Inc.*

For more data insert No. 23 on postcard, p. 37.

Radial Relief Grinder

Stepless speed control from 0 to 80 rpm by turning a dial knob.

Outstanding feature of the new model is stepless speed control, achieved with a selenium rectifier. The motor is a dc, 110 v, gear reduction type offering 40:1 ratio



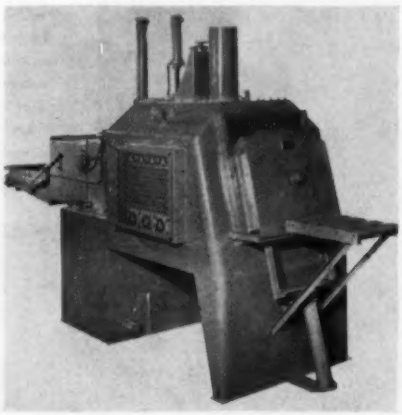
and giving 44 in. rounds torque. The fixture which can be used with a number of standard tool grinders is offered with or without the stand and grinder. *Royal Oak Tool & Machine Co.*

For more data insert No. 24 on postcard, p. 37.

Heat Treating Unit

Controlled atmosphere; maximum operating temperature of 2100° F.

A semi-automatic controlled atmosphere unit for bright heat treating is rated at 100 lb per hr. The hearth is 12 in. wide x 18 in. long x 10 in. high. The unit consists of a furnace sealed to a combination cooling chamber and quenching tanks. The work is manually loaded into the furnace and the transfer from the furnace to the cooling or quenching section is done without breaking the atmosphere seal. The furnace is electrically heated, using eight bars for 16 kw input. The cooling chamber is water jacketed with automatic temperature control. The quench tank has built-in oil heating and cooling coil also with automatic temperature control. A pneumatic operated elevator is used in quench-



ing and the oil has two speed propulsion. All doors are pneumatically operated. *Ipsen Industries, Inc.*

For more data insert No. 25 on postcard, p. 37.

Zinc Diecasting Machine

Air-operated, capable of a free cycling speed of 1000 shots per hr.

Completely automatic cycling and adjustable timing dwell on the opening and closing of the toggle and injection of the molten metal are features of a new zinc diecasting machine. The machine will produce castings up to 1 lb capacity utilizing die blocks from 1½ in. thick x 8 x 9

in. with an allowable increase in die thickness to 3 in. for each half. The machine is ruggedly constructed with a 200-lb pot and powerful toggle arrangement to insure relatively flash free castings. *A B C Die Casting Co.*

For more data insert No. 26 on postcard, p. 37.

Carbide Diemakers Tools

Rotary finishing tools in a set for finishing soft or hardened dies.

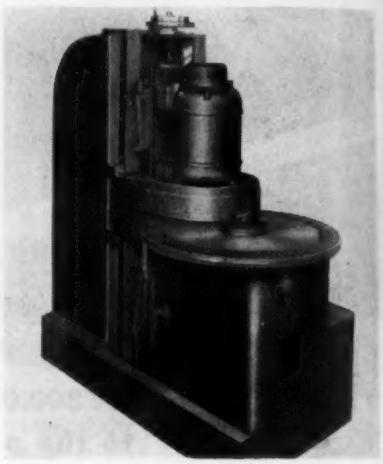
A set of eight ¼-in. shank carbide rotary finishing tools designed for the tool and diemaker, have cuts, tooth patterns, and shapes selected to cover the greatest possible range of usefulness. Made of a selected grade of carbide resistant to flaking and chipping, they finish hardened or unhardened dies smoothly and accurately. Di-Car Set No. 40 is furnished in a convenient flat wooden case. *Severance Tool Industries, Inc.*

For more data insert No. 27 on postcard, p. 37.

Double Disk Grinder

Grinds two parallel flat surfaces on small workpieces in 1 operation.

Two 18-in. diam solid center abrasive disks are each driven by a 3 or 5 hp motor. Disks are each 2-in. thick. The 32-in. diam rotary



work carrier is made to suit the types and sizes of the workpieces to be ground. Finger tip speed control is provided for an infinite range of work carrier speeds between ⅛ and 1 rpm. A bayonet lock for the rotary work carrier permits rapid change of the carrier plate when changing work setup or dressing the disks. Both grinding heads may be independently adjusted by means of graduated hand wheels, and tilted for jobs requiring progressive grinding of the workpiece. The path of the workpieces is directly across the center of the abrasive disks. *Gardner Machine Co.*

For more data insert No. 28 on postcard, p. 37.

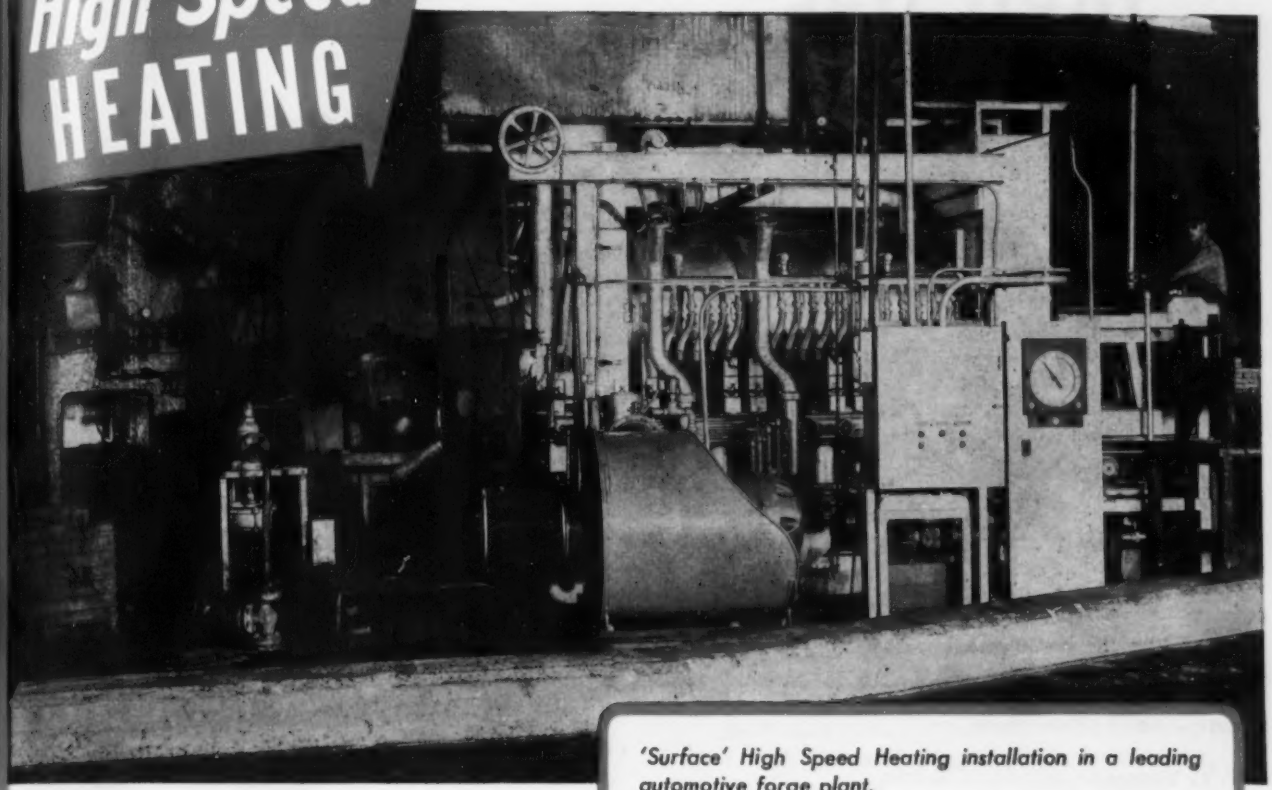
Positioner for Welding

Allows instant start and stop to synchronize with welding machine.

The positioner designed for automatic welding has a solenoid actuated clutch that allows instant

Turn to Page 130

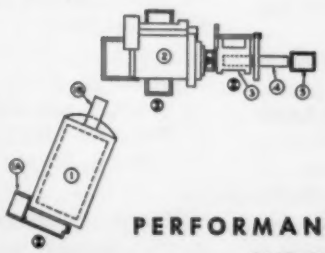
'Surface' High Speed HEATING *for* Production Forging



'Surface' High Speed Heating installation in a leading automotive forge plant.

'Surface' High Speed Heating Furnaces have been making performance records wherever they have been installed in leading production forging plants. Increased production . . . better quality of product and work . . . improved working conditions, all without added floor space, combine to make these furnaces the choice over other heating methods.

Now, you can create New Profits in Production Forging by converting to 'Surface' High Speed Heating. More descriptive data on the high speed combustion system, the furnace unit, application and comparative costs are available in 'Surface' Bulletin SC-144. Write for your copy—today!



1. BILLET HEATING FURNACE
1A. STOCK BOX
1B. HOT BILLET DELIVERY CHUTE
2. FORGING PRESS
3. TRIM PRESS
4. TRIMMED FORGING CONVEYOR
5. TOTE BOX

PERFORMANCE DATA

PART: Steering knuckle support.
RATED CAPACITY OF FURNACE:
300 Billets (17 lbs. ea.)
SIZE 19" x 2¼" x 1¼"
REMARKS—
Die life increased 16%
Scrap loss less than 2%
Maintenance less than $.30/ton
FURNACE: Automatic pusher type equipped with dampers for atmosphere control.

SURFACE COMBUSTION CORPORATION • TOLEDO 1, OHIO

FOREIGN AFFILIATES: Stein & Roubaix, Paris — British Furnaces, Ltd., Chesterfield

'Surface' **INDUSTRIAL FURNACES**

FOR: Gas Carburizing and Carbon Restoration (Skin Recovery), Homogeneous Carburization, Clean and Bright Atmosphere Hardening, Bright Gas-Normalizing and Annealing, Dry (Gas) Cyaniding, Bright Super-Fast Gas Quenching, Atmosphere Malleableizing and Atmosphere Forging. Gas Atmosphere Generators.

IRON AGE *introduces*

M. D. Conroy, appointed vice-president in charge of industrial relations; **J. W. Hargate,** vice-president in charge of purchasing, and **W. F. Hoelscher,** secretary of the GRANITE CITY STEEL CO., St. Louis. The two vice-presidential posts are new positions created by the board of directors.

John W. Ochler, named sales manager of the enginering works division of DRAVO CORP., Pittsburgh.

N. H. Balaam, transferred from northern California district sales office of KAISER STEEL CORP., to Washington, D. C., to manage the recently-opened offices there.

W. C. Thompson, appointed district sales manager, Cleveland district for the COLD METAL PRODUCTS CO.

Worthington J. Gross, appointed manager governmental division, Washington, D. C., and **Bert C. Landstrom,** appointed district representative for the seven Eastern states and the Northeastern part of Canada for the ATHEY PRODUCTS CORP.

Edwin J. Heimer, appointed sales manager of hand lift and motorized hand trucks of the Philadelphia division of the YALE & TOWNE MFG. CO. **W. Glen Tipton** is retiring after 23 years of service with the company.

Walter Zimmermann, named district manager for the COLUMBIA TOOL STEEL CO., Cincinnati. Mr. Zimmermann replaces **James Terry** who has resigned.

F. O. Dutton, joined the staff of BENDIX HOME APPLIANCES — Division Avco Mfg. Corp., South Bend, Ind. Mr. Dutton devotes the major portion of his time to special procurement assignments.

Chester F. Delbridge, appointed general sales manager of the K-G EQUIPMENT CO., INC., New York.

C. Fred Watkins, appointed general sales manager for the AMERICAN SWISS FILE & TOOL CO., Newark, N. J.

Thomas A. Claiborne, transferred from the Houston office to the Cleveland district office of the VANADIUM CORP. OF AMERICA, as service engineer.

Frank L. Hooper, appointed general sales manager of KALEX CORP., New York.

Kenneth C. Specht, named manager of trade sales for NATIONAL LEAD CO., New York.

Robert C. Smith, named manager of product education for WILLYS-OVERLAND MOTORS, farm sales department, Toledo.

Marvin Friedman, appointed production manager and secretary of the ANDREL PRODUCTS CORP., New York.

J. J. Llanso, appointed general export manager of WORTHINGTON PUMP & MACHINERY CORP., Harrison, N. J.

Harold G. Lolley, joined the ROSEDALE FOUNDRY & MACHINE CO., Pittsburgh, as foundry superintendent.

Benjamin E. Feeley, appointed production control manager for HUNTSPILLER MFG. CORP., Boston. Mr. Feeley succeeds **R. G. Fredette,** who resigned.

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WALLACE B. PHILLIPS, elected president of Pyrene Mfg. Co., Newark, N. J.

ALBERT J. BOLD, elected executive vice-president of the Superior Metal Fabricating Co., Niles, Ohio.

L. W. EVANS, named vice-president of Rheem Mfg. Co., South Gate, Calif.

IRON AGE

salutes

Frank R. Milliken

NEXT week the American Institute of Mining & Metallurgical Engineers will honor Frank R. Milliken, assistant manager, Titanium Div. of National Lead Co., for "advancing the technique of the metallurgy and beneficiation of titanium-bearing ores."

Frank Milliken belongs to the corps of young engineers who are helping build a more powerful America. For 10 years Mr. Milliken has sparked National Lead's drive for ore to meet industry's needs for titanium products. Jet engines, paint, paper and shoe paste depend on a steady flow of titanium ores.

In 1941, National Lead, looking for the man to head up production at its MacIntyre Development at Tawahus, N. Y., 50 miles south of Lake Placid, called Frank Milliken from Utah where he was chief metallurgist for a group of consulting engineers.

The Tawahus mine and mill were carved from wilderness. Putting wide experience in mineral dressing and development of ore flow sheets to work, Frank Milliken had a large part in design and development of the Tawahus plant.

With ingenuity, drive and persuasiveness, Mr. Milliken had the Tawahus plant, first in the country, in full operation 19 months after designs were started. He solved the problem of ilmenite recovery by flotation from slime ores. The plant is now producing well in excess of its 4000 tons a day rated capacity.

Friendly, quiet, even-tempered Frank Milliken lives at Darien, Conn., has two sons. He plays golf and is an enthusiastic fisherman and hunter.

CLEM W. GOTTSCHALK, appointed assistant vice-president—Traffic of the Jones & Laughlin Steel Corp., Pittsburgh.

JAMES W. KINNEAR, JR., appointed assistant to vice-president —Manufacturing of U. S. Steel Co., Pittsburgh.

C. L. FIX, named works manager of Mullins Mfg. Corp.; Liberty plant at Warren, Ohio.

GEORGE EBERT, appointed comptroller of the Riverside Metal Co., Riverside, N. J.

IRON AGE *introduces*

Continued

Edmund Fitzgerald, elected a member of the board of directors of ALLIS-CHALMERS MFG. CO., Milwaukee.

Deane R. Ebey, named co-ordinator of defense activities for plastics at the DOW CHEMICAL CO., Midland, Mich. **Robert L. Curtis,** succeeds Mr. Ebey in the Los Angeles office, as supervisor of plastic sales.

John P. Mansfield, elected vice-president and director of the PLYMOUTH MOTOR CORP., Detroit. Mr. Mansfield is one of the veterans of the Chrysler organization, which is the parent company.

Harry C. O'Brien, retired as head of the container bureau, sheet and strip division, U. S. STEEL CO., Pittsburgh, after 47 years in the steel industry.

David A. Challis, Jr., appointed assistant general manager of sales, U. S. STEEL CO., Pittsburgh. **Walther H. Haggard,** named sales representative in New York for the coal chemical sales division.

R. K. Laurin, appointed assistant advertising manager of the meter & valve div., of ROCKWELL MFG. CO., Pittsburgh.

E. R. Walsh, III, appointed general sales manager of ALLOY RODS CO., York, Pa.

Joseph W. S. Davis, named assistant to the vice-president, eastern regional sales, by the AMERICAN LOCOMOTIVE CO., New York.

Seton Porter and **John E. Bierwirth,** elected to the board of directors of DOREMUS & CO., New York.

Fielder Israel, named assistant to the president of GENERAL DRY BATTERIES, INC., Cleveland.

Orvin K. Gaskins, appointed manager of aircraft and assigned sales, Ewart plant of the LINK-BELT CO., Indianapolis.

Thur Schmidt, appointed assistant to the president, Ingersoll Products Div., BORG-WARNER CORP., Chicago.

James B. Fenner, named vice-president and comptroller of the ELECTRIC AUTOLITE CO., Toledo. Other vice-presidents elected: **H. E. Hasemeyer, R. M. Lake, C. L. Lancaster** and **Lyman A. Wine.**

John W. Willard, assumes new responsibilities as sales training manager and director of personnel for LAMSON CORP., Syracuse, N. Y.

Arthur I. Schell, appointed superintendent, No. 7 machine shops of the MIDVALE CO., Philadelphia.

George L. Marchant, named manager of the Boston district of the replacement tire sales division of the B. F. GOODRICH CO. Mr. Marchant succeeds **L. L. Black** who is retiring. Mr. Black had been with the company since 1916 and held a number of executive sales posts.

Charles Bangert, Jr., appointed manager of engineering for the TRUMBULL ELECTRIC MFG. CO., Plainville, Conn. **J. J. Pascher,** appointed district sales manager, New York district, for the company.

Ralph R. Newquist, named executive vice-president of the ROOTS-CONNERSVILLE BLOWER CORP., Connersville, Ind.

L. D. Rigdon, named assistant to vice-president in charge of manufacturing, and **C. G. Wallis,** named manager of the headquarters manufacturing department, of WESTINGHOUSE ELECTRIC CORP., Pittsburgh.

George P. Extrom, elected treasurer of the GISHOLT MACHINE CO., Madison, Wis. Mr. Extrom has been with the company for nearly 35 years and has been acting as assistant secretary for the past 10 years.

OBITUARIES

Willard N. Lynch, president of Keystone Drawn Steel Co., Spring City, Pa., died recently.

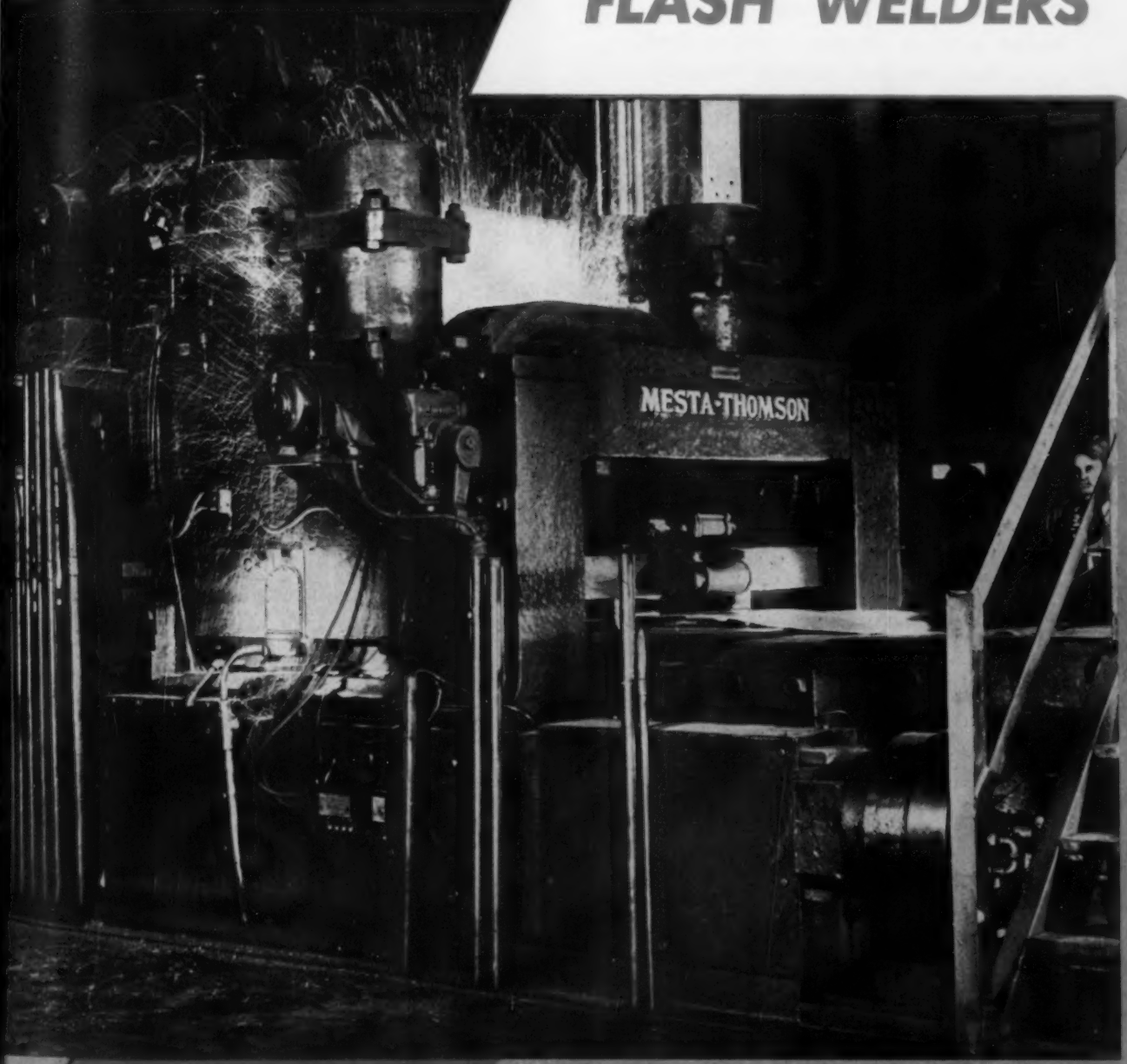
Leslie R. Taylor, 60, president of International Heater Co., died recently in New York.

H. W. Porter, president of H. K. Porter, Inc., Sommerville, Mass., died recently.

Yellott F. Hardcastle, 67, director of the Pennsylvania Salt Mfg. Co., Philadelphia, died recently.

Increase

Cold Mill Production with . . . MESTA-THOMSON FLASH WELDERS



Mesta-Thomson Flash Welder installed in a Mesta High-Speed Continuous Pickling Line

MESTA MACHINE COMPANY

PITTSBURGH, PA.

Designers and Builders of Complete Steel Plants

on the assembly line

automotive news and opinions

Carmakers weigh big output slash . . . Dodge peps up its new truck engines . . . Rail walkout affects industry.

by Walter G. Patton

NPA Brews Storm—A puzzled and perplexed automobile industry was trying this week to digest the true significance of reports from Washington that auto output may be slashed as much as 40 pct during April, May and June. If this promise holds it will mean (1) widespread unemployment in the industry, (2) wholesale cancellations of steel conversion contracts, (3) compounding of the confusion that already exists about future steel supplies.

Layoffs have already stung the industry which now claims as many as half a million workers could be idled by NPA material cutbacks. The industry's position is that NPA has failed to show either that the steel and other metal reductions are necessary or are likely to become necessary.

Rail Walkout Effects—If the NPA cutbacks were not enough, the railroad strike also took its toll. Last week Ford Motor Co. sent half the force at its huge Rouge plant home for an indefinite period. Approximately 30,000 men were affected. Ford is also laying off at its assembly plants scattered throughout the country.

GM was similarly hit, reporting 70,200 idle at 26 plants. Nash has reported 14,000 idle, Studebaker has laid off 12,750. Chrysler was also affected. While railroad switchmen came straggling back to work, the auto workers faced a bleak future. Once again the adage was proved: the duration is always longer than the strike.

Wayne University Exhibit—Detroit's fast-growing group of stress engineers had an opportunity last week to see a display at Wayne University of the latest equipment for measuring stress—strain gages, amplifiers, oscilloscopes, transducers, stress-coating, photo elasticity and high-speed photography.

Approximately 300 members and guests of the Society for Experimental Stress Analysis saw a demonstration of high-speed motion pictures taken of a beam breaking under the impact of a falling weight. Pictures were taken at a rate of 7500 frames per second.

Lecture Session—Dr. J. H. Meier, of Bucyrus-Erie Co., Milwaukee, president of S.E.S.A., described the latest methods and equipment used for measuring loads and performance characteristics of power shovels and earth-moving machinery. Another speaker was Richard Kemp, National Advisory Committee for Aeronautics, who reported the results of studies of turbine blade vibration and strain in high temperature operations of aircraft turbines.

Using German Thunder—Cold extrusion, a metallurgical development used extensively in Germany during World War II to conserve steel, is expected to be extended substantially by the auto industry in the years ahead. Both Chrysler and Ford are cold extruding several parts.

The process is also being used by several auto parts plants for the production of shells. Advantages of cold extruded parts include high strength resulting from work hardening, elimination of machining and substantial savings in material.

Dodge Truck Changes—Dodge engineers have extended twin carburetion and twin exhaust as a means of giving truck buyers in the 2¾ to 3½ ton class more power and greater economy. Engine output on these models has been increased 18 to 20 pct, resulting in higher average gross speed, faster hill climbing, greater economy and less driver fatigue.

Other new features in Dodge trucks include higher governor settings, redesigned fuel pumps, "hotter" spark plugs with improved moisture-proofing, larger generators and more efficient cooling systems.

Oriflow Shocks for Trucks—Light, ½ to 1 ton models are

WHEELABRATOR® saves $700.00 monthly

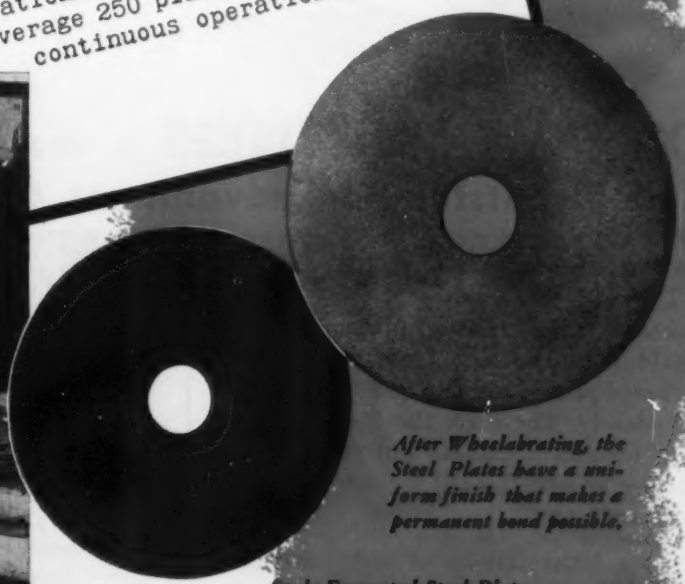
preparing steel plates for bonding abrasive wheels

at ARMSTRONG & WHITE, INC.
Cheswick, Pa.

"We installed Wheelabrator airless blast cleaning equipment for the exclusive operation of removing scale and obtaining a uniform finish on circular steel plates. We manufacture steel plates to which molded abrasive wheels are bonded by the grinding wheel companies. Naturally, the plates must be completely free of any scale from the hot rolling and the surface must be uniform to obtain the maximum bonding property, and we have found that Wheelabrating does a very satisfactory job. We estimate that we are saving a minimum of $700.00 per month over our old preparation method. In addition to this we have eliminated the problem of rust accumulation by doing the blasting immediately prior to running the plates through our finishing line, which is possible due to the relatively high speed operation of the Wheelabrator. We can average 250 plates per hour on continuous operation."

elminates rust accumulation

provides the uniform finish needed for bonding stone to steel plates



After Wheelabrating, the Steel Plates have a uniform finish that makes a permanent bond possible.

Scale Encrusted Steel Plate before Wheelabrating.

As manpower becomes more and more critical, the time-saving advantages of the Wheelabrator become even more important to you. One man and a Wheelabrator often can do the work of a crew. Send samples of your work for a free demonstration. *Write today for full details.*

American WHEELABRATOR & EQUIPMENT CORP.

510 S. BYRKIT STREET, MISHAWAKA 3, INDIANA

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

"Let's keep this just as quiet as we can!"

EXTREME QUIETNESS is one of the 6 outstanding advantages of "COMPO"® and "POWDIRON"® BEARINGS AND PARTS

Constantly maintained oil film ends noisy metal-to-metal contact. Accurate dimensioning keeps parts working together smoothly and silently. These are the "let's keep it quiet" features of "COMPO" and "POWDIRON" bearings and parts—put them to work in *your* product!

For the latest line-up of stock sizes of "COMPO" bearings, write on your company letterhead. Consult our Engineering Department on special requirements for bearings or parts.

Send for this FREE Booklet

"THE 6 OUTSTANDING ADVANTAGES OF "COMPO" and "POWDIRON" are:

1. Extreme quietness
2. Efficient self-lubrication
3. Low installation cost
4. Low operating and maintenance cost
5. High load capacity at high speeds
6. Low unit cost

BOUND BROOK
OIL-LESS BEARING COMPANY
BOUND BROOK, N. J. • BOUND BROOK 9-0441
ESTABLISHED 1883

"COMPO" • "POWDIRON" • "BOUND BROOK"

(Advertisement)

POWDER METALLURGY

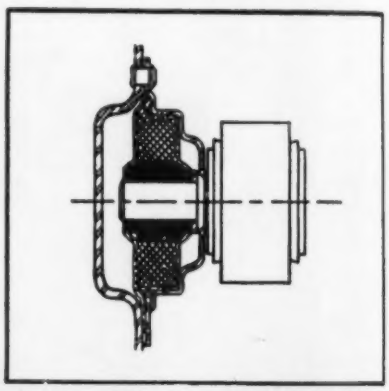
Parts Result in Quiet Operation

Manufacturers of household appliances, business machines and factory equipment have long recognized the importance of quiet operation as a selling tool. Product designers have found economical ways of obtaining this desirable feature through increased use of bearings, gears, cams and other parts produced by powder metallurgy.

These bearings and parts, manufactured under the trade names of "COMPO" (porous bronze) and "POWDIRON" (sintered iron) assure extremely quiet operation because of (1) their accurate dimensions; (2) their method of lubrication.

Accurate Dimensions

"COMPO" and "POWDIRON" bearings and parts are die-formed to their final dimensions within extremely close tolerances. Hence the play of shafts in bearings can be kept to a minimum; gear, cams and similar parts mesh closely and quietly. These advantages are obtained without any need for expensive machining operations to give the required tolerances.



In this application of a self-aligning "COMPO" bearing in an electric fan, accurate dimensioning permits extremely close running clearances, essential for quiet operation.

Method of Lubrication

The lubrication principle used in "COMPO" and "POWDIRON" eliminates any noise-producing metal-to-metal contact between moving parts. When the machine is at rest, oil is stored uniformly throughout the capillary structure of the bearing or part. When the machine starts, oil is instantly fed to the surface from the microscopic pores, thus maintaining a constant oil film.

Recommendations on "COMPO" and "POWDIRON" bearings and parts for specific applications may be obtained from the manufacturer, Bound Brook Oil-Less Bearing Company, Bound Brook, N. J.

assembly line

Continued

equipped with the new Oriflow shock absorbers. Brake cylinders are now anodized for positive protection against rust and corrosion. A new cycle-bond molded tapered brake lining has been developed to give more positive action and reduce any tendency to grab or squeal.

Four piston rings are used. The top ring is chrome-plated. Chrysler is also offering fluid drive on light models up to 1 ton, including the Route-Van.

Steel Quota Reductions—Steel delivery promises are being cut still further, indicating a continued drop in automobile output. Some mills report consumers' quotas will be reduced as much as 50 pct during March and April. Steel sources report that DOs are taking as much as 50 pct on sheets and almost 70 pct of output on carbon bars.

The freight car program, increased production of military vehicles and the demands for steel mill expansions have all contributed to the increased defense requirements. Another factor is increased tonnage for shell production.

Here to Stay—More than 3.5 million GM cars have already been equipped with automatic transmissions.

The first Hydramatic, introduced in 1939 by Oldsmobile, was sold to 10 pct of the new Olds car buyers. Demand increased to 74 pct in 1946. Last year 94 pct of Olds buyers ordered Hydramatics.

In 1940 only 2 pct of new Cadillac owners wanted automatic transmissions. The 1946 percentage reached 86. Last year the total was more than 97 pct.

Pontiac has a record of 65 pct for Hydramatic since its introduction 2 years ago. Last year 77 pct of all Buicks were Dynaflow-equipped. Production of the Chevrolet Powerglide has now reached 2000 units a day.

Ready for Trouble — Defense work in the automobile industry has not been confined to engineering and tooling. Ford, for exaxmple, has formed a Security Committee to formulate a company-wide disaster preparedness program. Top Ford executives headed by John S. Bugas, vice-president industrial relations, sit on the committee.

Detailed plans to protect the company against sabotage or internal attacks are being developed. Plans to protect all confidential reports against espionage are being worked out. These efforts have been carefully integrated with Federal, state and local defense planning.

Code of Ethics—Packard sales executives have drawn up a new code for Packard dealers, reaffirming a position taken 5 years ago. Here are some of the fair trade practices advocated by Packard sales executives:

(1) Fair trade-in allowance and acceptance of the customer's order *without* a trade-in.

(2) Make new car deliveries in the same sequence in which the orders are placed.

(3) Buy and sell new and used cars at prices established by regulation.

(4) No "loading" of accessories on new cars.

(5) Bill customers of service department for parts and labor at established prices and provide estimates of costs in advance.

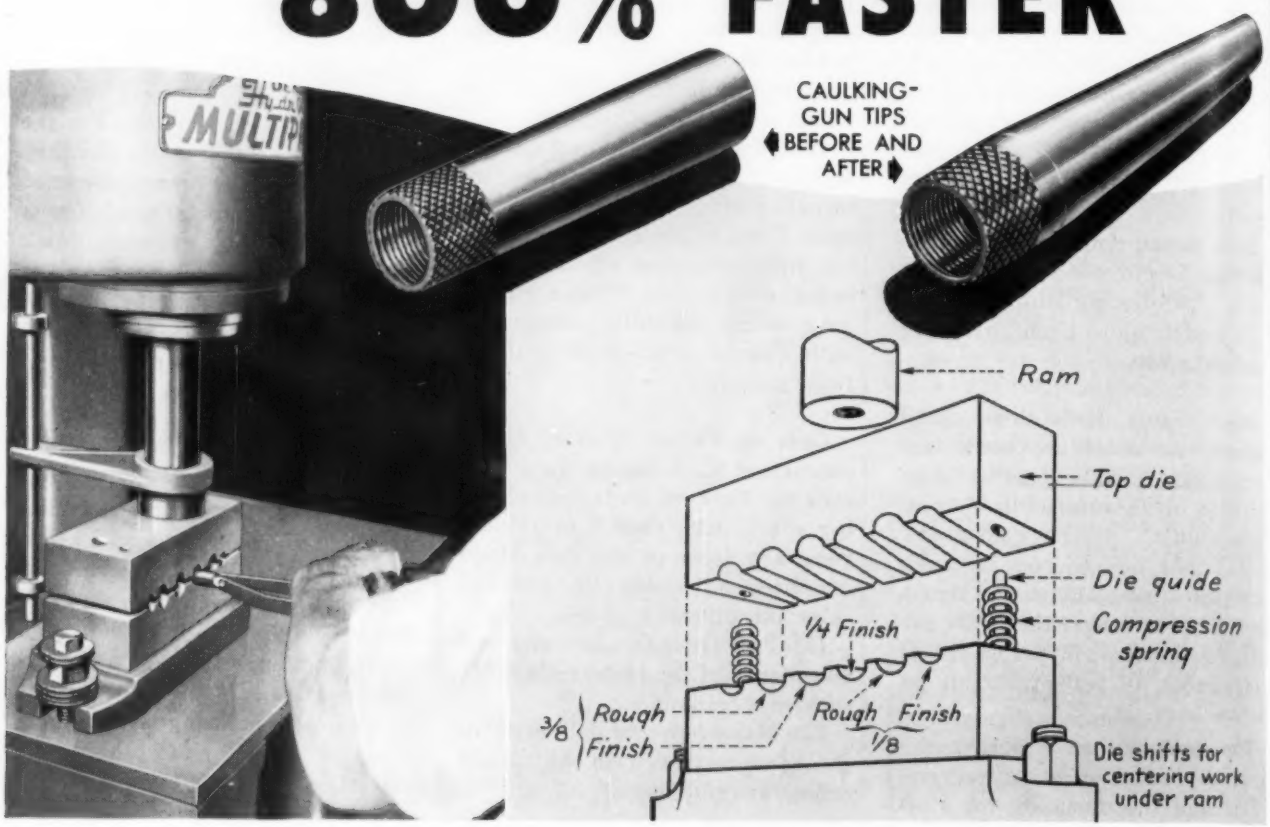
Arsenal to Warehouse—For the past 5 years Buick Motor Div. has been using the government-owned Grand Blanc tank arsenal for a parts warehouse. Last week Buick bought this 500,000 sq ft plant which was operated by Fisher Body during World War II. Buick will continue to use the building as a parts warehouse.

Small Arms Order—This week Saginaw Steering Gear Div. announced the contract for the manufacture of parts for small arms. The parts will be produced in Steering Gear Plant No. 2. Tooling is being placed in anticipation of production within the next several months. During World War II Saginaw Steering Gear made machine guns and other war materials.

THE BULL OF THE WOODS — **By J. R. Williams**

FOR DE WIFE A BIRTHDAY PRESENT! I SNEAK AROUN' AN' MAK DE CARVING SET FROM OLD FILES-- HOW YOU TINK IS IT?
YOU MADE THESE? WHY, MAN, YOU SHOULD BE IN THE TOOL ROOM!
YOU CAN'T HURT HIS FEELIN'S, BUT HE OUGHTA BE TOLD A VISE SHOULD GO WITH THAT OUTFIT TO HOLD ANYTHING SHE CUTS WITH IT!
J.R.WILLIAMS
2-16
THE "AND" IRONS

MULTIPRESS® SWAGES 'EM 800% FASTER



Vibratory Control Feature Plays Big Part in Record Production at Crew Manufacturing Co.

A swaging operation that used to take 3⅓ minutes is now done in *24 seconds* at the Crew Manufacturing Co., Cleveland, Ohio. An 8-ton Multipress makes the big difference.

The job is to taper half-inch tube steel to form caulking gun tips with apertures of ⅛", ¼" and ⅜". Multipress does it faster, gets more uniform results, and has eliminated scrap losses.

Vibratory Ram Action—an accessory available only on Multipress—is a big factor in this amazing speed-up. It delivers short, rapidly repeated strokes of uniform, pre-set pressure, forming the parts in a quick series of easy stages. The operator holds the tubes with inside pliers, and rotates them as he feeds them to the desired depth. Top and bottom halves of the die, separated by compression springs, open slightly between each vibratory ram effort, making it easy to feed the parts.

The die contains both roughing and finishing cavities for all three sizes of parts. It is simply moved to right or left to bring the desired cavities directly under the press ram—no die changes are required.

Worker fatigue has also been sharply reduced by the quieter, easier, oil-smooth operation of the Multipress.

Gains like these are an old story with Multipress, on an extremely wide variety of production jobs. Multipress — an oil-hydraulic tool featuring advanced engineering design—can readily be tailored to your specific needs, in eight different frame sizes, with capacities ranging up to 50 tons. Available accessories include indexing tables, dial feed tables, harmonic stock feeds, straightening accessories, and foil marking attachments. Write today for full details!

A typical 4-ton Multipress equipped with a 6-station index table. Capacities to 50 tons available.

DENISON HydrOILics

The Denison Engineering Co.
1158 Dublin Road, Columbus 16, Ohio

west coast progress report

digest of far west industrial activity

by R.T.Reinhardt

Poor Metallics Prospect—Western steel producers and foundries are faced with the same problem as many of their customers—where to get the raw materials with which to operate at capacity levels?

Western steel producers and foundries face a deficit of approximately one-half million net tons of metallics annually if they anticipate operating at capacity levels with existing facilities. By 1952, on completion of new steel ingot and cast iron pipe producing facilities, this deficit will reach an estimated 1 million net tons.

Changing Situations — At the outbreak of World War II the seven western states formed a surplus scrap area with No. 1 heavy melting selling at $13 per gross ton in mid-1940 and with 1,300,000 net tons of scrap and pig iron required for capacity operations of ingot and casting furnaces. In 1940, 437,000 net tons of scrap were exported from the Pacific Coast.

How rapidly the picture has changed is indicated by the sharp increase in the scrap price at Los Angeles and San Francisco which last year rose from $20 per gross ton for No. 1 heavy melting in May to $30 per gross ton in November. Current frozen price is $35 per gross ton.

Future Metallics Supply—It is estimated the future Far Western supply of metallics will not exceed 4 million net tons, and pig iron production from present blast furnaces probably will not exceed rated capacity of 2,189 thousand net tons. This would be an increase of 310,000 tons over 1950 actual production.

Ability to maintain capacity operations at the Kaiser furnaces at Fontana depends on continued receipt of 72,000 net tons of Colorado coke annually; if cut off, pig iron output would drop 93,000 net tons a year.

Scrap Imported — Kaiser and Geneva in Utah, including the Ironton furnace, have a combined capacity of 2,189,000 net tons per year. In assaying the metallics available for production of steel ingots and steel and iron for castings, B. E. Etcheverry, Kaiser cost director, reports local production of purchased scrap cannot be counted on to exceed the 1950 figure of 1,800,000 net tons and points out the balance of 2 million net tons of pig iron consumed in 1950 reflected imports of 50,000 tons and a reduction in consumers' inventory of 150,000 tons.

Prompt scrap is less of a factor in the West than nationally because of local processing operations. The high percentage of steel products are not processed after leaving the mill.

Present Metallic Demand—Western producers of ingots and iron and steel castings used 2 million net tons of purchased scrap and 2 million tons of pig iron in 1950. With capacity on Jan. 1, 1951, of 4,640,000 net tons, 549,000 tons over 1950 output, 440,000 additional tons of purchased scrap and pig will be required.

Pacific States Cast Iron Pipe Co. at Ironton, Utah, needs 100,000 tons of pig iron to operate at capacity, 40,000 tons over their receipts in 1950. Operation of West Coast steel producers at their January 1951 capacity and operation of other consumers at 1950 rate would require 4,480,000 tons of purchased scrap and pig iron.

Another Record—New production records were set at Kaiser Steel Corp., Fontana, in January: 78,466 tons of steel products for shipment compared to 77,754 tons in August 1950, previous high; 76,274 tons of pig iron against 69,960, the previous record; and the openhearth poured 110,789 tons of ingots, almost 3000 tons above the best previous month. Iron ore shipped from Eagle Mountain totaled 100,562 tons, a new high.

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In metal cutting, shearing, or trimming operations you can keep costs 'way down . . . and production up . . . by standardizing on Heppenstall Knives!

If you're not using them, don't be satisfied with the "average service" you think you're getting with your present knives. Specify Heppenstall Knives . . . and honestly, you'll be surprised at the difference!

Long-time users know that Heppenstall Knives, made from our own electric induction steels, are the finest knives obtainable. They consistently deliver greater tonnage per edge . . . more and cleaner cuts per grind . . . per knife . . . and per dollar of original cost. Why not order a set today?

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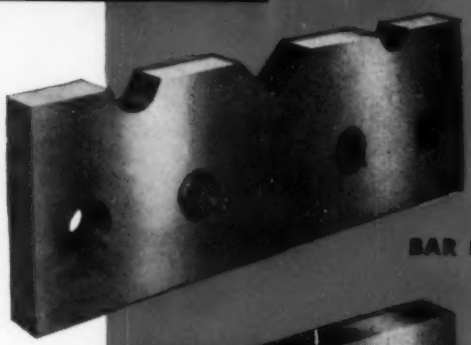
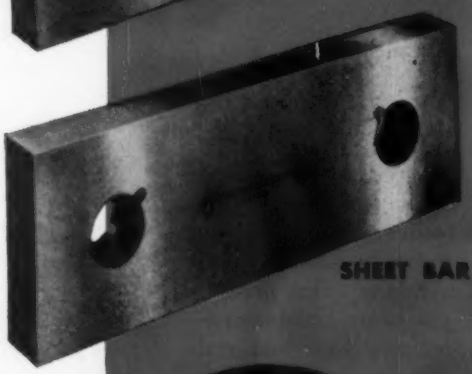

BAR KNIFE

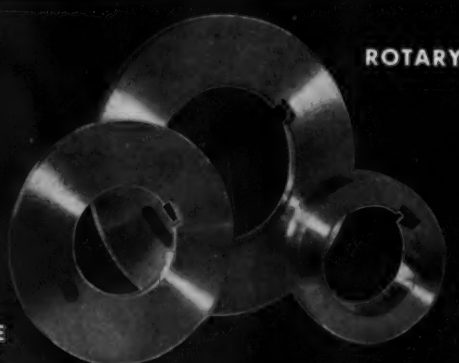

SHEET BAR KNIFE

HALF SLITTER

PINCH KNIFE

FLASH TRIMMER KNIFE

SLITTER KNIFE


ROTARY KNIFE

SPACER

Heppenstall

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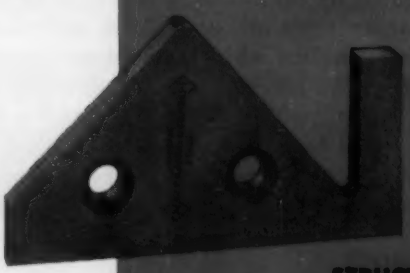
STRUCTURAL KNIFE

the federal view

this week in washington

by Eugene J. Hardy

Payments for Tool Wear — The Munitions Board and the military services are consulting with industry on permitting accelerated depreciation for abnormally intensive use of machinery and equipment in defense plants.

The military knows two or three shift operation can break down machinery in perhaps 5 years, when the normal depreciation period might be 20 years.

What is likely to result is not accelerated tax depreciation but additional compensation in contracts to take care of such abnormal wear and tear. In addition, the military will provide tools from the National Industrial Reserve to replace worn-out equipment or to meet initial needs.

Seaway Chances Brighter—New support in Congress for the St. Lawrence seaway may provide the momentum necessary to get the controversial project started after many years of delay.

The need for an efficient and cheap means of moving Labrador iron ore to the Great Lakes and midwestern steelmaking centers has caused a number of congressmen to alter earlier positions. The opposition camp has dwindled. Only eastern seaport and pro-railroad members are now hold-outs.

In Time for Need? — Seaway proponents are citing the vital need for ore and other steelmaking materials in the rearmament program, but their critics point out that at least 5 years would pass before even a single boatload of ore could navigate the proposed waterway.

One of the influences affecting the fate of the proposal is what attitude the Senate and House will take toward President Truman's budget. There is considerable pressure on the lawmakers to trim non-defense expenditures, and a snowballing movement to cut all "nonessential" appropriations might result in another year's postponement of the project.

Cut Investigation Time — Military security clearance regulations are being revised to prevent unnecessary production delays while plants are being investigated. Security investigations of plant employees might take as much as 120 days while the contract involved might have a 45-day delivery date.

Under the new program, the military departments will eliminate investigations when only "Restricted" contracts are involved, and on "Confidential" contracts an interim clearance will be used pending completion of a full security investigation. Contracts bearing a higher security classification will still require full investigation.

Also in preparation are a manual standardizing investigative procedures and a uniform security agreement for the three services.

Uniform Inspection — General Services Administration, cooperating with the Munitions Board and the military services, has issued a Government-wide regulation in inspection services and testing.

Generally, inspection will be at the supply source if the items are in continuous volume production, or if quality control and inspection are related to a plant's production methods, or if inspection at any other point would cause delay or expense. Inspection will be at destination for off-the-shelf items, brand name or simple commercial items, and on products from plants where the volume of buying is not enough to justify a full-time inspector.

Ore Shipping to be Approved—Canadian ore boats are going to get a piece of the Great Lakes ore-shipping business again this year.

By law, iron ore and other products moving between U. S. ports must be shipped in U. S. vessels, but Congress has suspended this statute each year since the start of World War II because of the need for ships.

Last year, U. S. shippers and vessel owners thought they were about ready to dispense with Canadian shipping companies, but today's tremendous demand makes it likely that Canadian vessels will again be permitted to move iron ore until Dec. 31, 1951.

Approval of legislation to further suspend the ban on shipping via vessels of Canadian registry will probably get Congressional approval.

Help Yourself to Better Bearing Performance

Here are two famous bearing materials that give you superior bearing performance at nominal initial cost. Both are readily available at Ryerson.

Glyco babbitt metal is a lead base alloy with physical properties equal to those of high tin babbitt. Introduced in this country by Ryerson almost 50 years ago, Glyco babbitt is made by an exclusive process which gives the greatest possible homogeniety of texture and unvarying uniformity. It is available in five grades covering all bearing applications—light or heavy shock loads, low or high shaft speeds.

Ryertex is a phenolic laminated-textile composition developed under Ryerson sponsorship. Possessing an extremely low coefficient of friction, it may be used with practically any lubricant—water, oil or grease, alone or in combination. Adaptable to almost any size or shape, Ryertex bearings are out-lasting and out-performing other types of bearings in many steel and paper mill applications, in the marine field and in other industries.

Write for full details on these money-saving bearing materials.

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JOSEPH T. RYERSON & SON, INC.—PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • CINCINNATI • CLEVELAND
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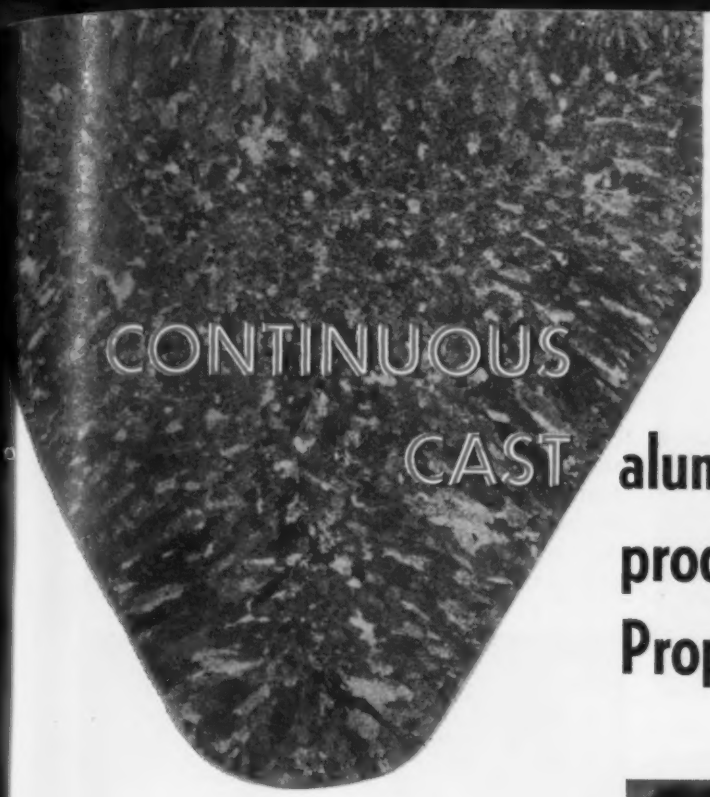


aluminum bars produced by the Properzi process

By D. I. BROWN
Feature Editor

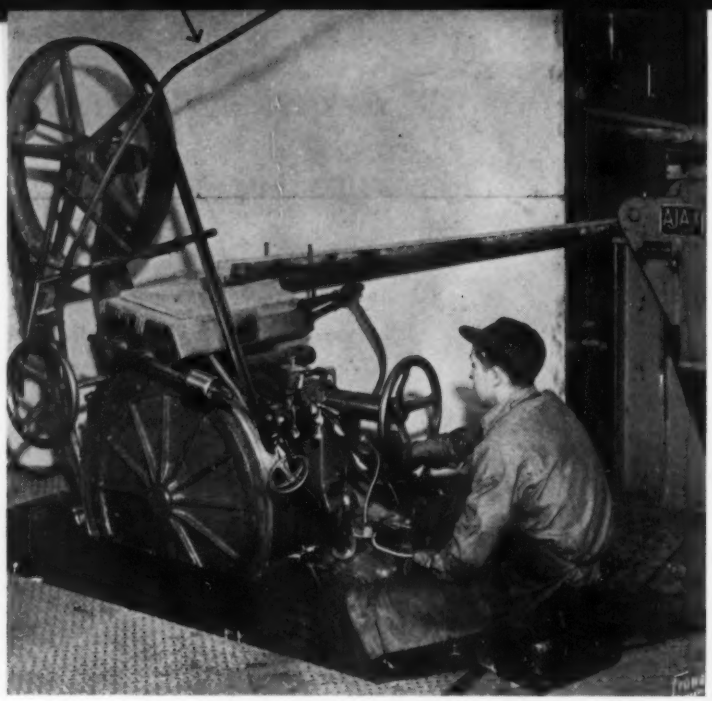
Nichols Wire & Aluminum Co., Davenport, Ia., has been continuously casting high purity aluminum bars since July 1950. The casting machine was designed and built by Mr. Ilario Properzi of S.p.A. Continuus, Milan, Italy.

The machine casts an equilateral triangular section 7/8 in. on a side. The headpiece above is a photomacrograph of the cast section. The cast section is then fed into a 15-stand continuous rod mill also of Italian design. The rolled rod in coil form is later cold drawn into various wire sizes. The two most popular sizes of rod rolled at Nichols are 9/32-in. and 3/8-in. diam. The end product of this material has been mostly consumer wire products.

The machine is an extremely simple device which casts at a speed of 10 to 30 fpm. The average weight of aluminum cast per hour is 1000 lb. Three 100-kw Ajax induction furnaces melt the pig and feed the casting machine. Scrap loss from pig to rod is extremely low averaging less than 1 pct and all scrap is remelted.

High purity aluminum 99.5 pct or better has

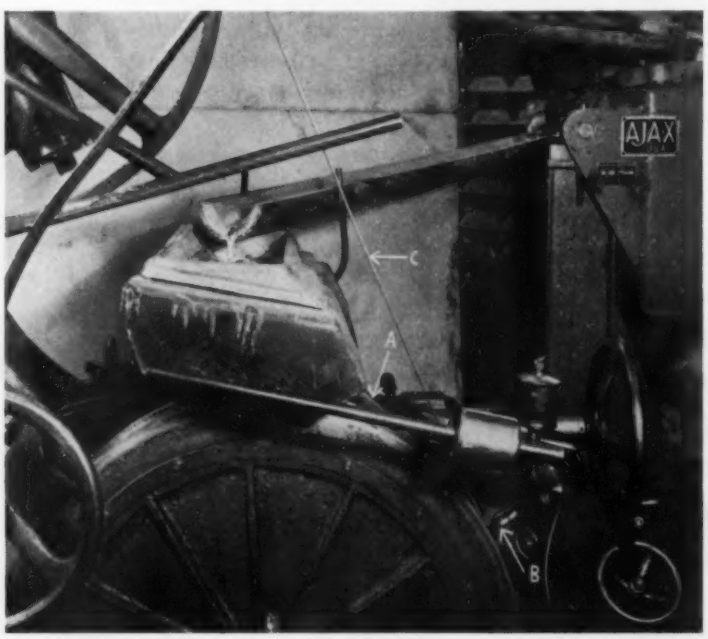
PART I **The continuous casting of aluminum bars has proved eminently successful in this country. The Properzi, Italian-made machine casts at a rate of 10 to 30 fpm. The casting machine is very simple in design and operation. Three men easily run the entire operation including the 15-stand continuous rolling mill which converts the cast section into coiled rod.**



CONTINUOUS CAST ALUMINUM rod, arrow, emerging from the Properzi machine. The small control wheel, center, adjusts turning speed of the wheel mold. The two larger control wheels control the tilt of the ladle and the machine itself.

been the chief metal processed. The Nichols Co. plans to cast and roll alloy grades of aluminum in the near future. Mechanical properties of the rods and wire made by this process are higher than those of the same metal processed by conventional methods. The Properzi casting machine and rolling mill require little floor space and a minimum number of men. Power requirements are also quite low.

THE HOLDING LADLE feeds through the spout A, into the mold cavity. The metal enters the cavity just above the brush marked B. The brush distributes the oil on the outside of the steel band C. In the background is the holding induction furnace which feeds hot metal into the ladle.



The three Ajax furnaces melt continuously. Two of these tilting furnaces feed the third unit. Molten aluminum is run out through refractory-lined cast iron troughs into the third furnace which serves as a holding unit. The third furnace then pours into the main trough which feeds the hot metal reservoir or ladle mounted on the casting machine. Three furnaces are used to permit melting flexibility so that small runs of alloy can be made if desired.

A schematic drawing of the casting machine, Fig. 1, consists of two revolving drum wheels and a steel band. The band passes over the drum wheels; tension on the top wheel keeps the band tight. This band serves as one side of the mold cavity which is cut in the copper portion of the bottom wheel. A cross-section of the

ONE OPERATOR controls feeding of the molten metal from three furnaces and the casting process. Pushbutton controls for pouring the three furnaces appear in the lower center portion of the photo. Below and to the left is the control button for stopping and starting the casting machine. The gas burner which heats the ladle can be seen just below the main feeding trough at the upper right.

copper mold with the band in place is shown in Fig. 1 also. The rim of the lower wheel is a copper casting which is bolted to the inner steel drum or hub. Circulating water is contained inside the hollow hub section of the lower two-piece wheel. The bottom portion of the casting wheel is immersed in a tank of water also.

The lower or casting wheel is 36¼ in. in diam. It revolves at a rate of 1¼ to 2½ rpm when casting. Speed of casting is essentially governed by the 3/16-in. round orifice of the spout which leads from the holding ladle to the

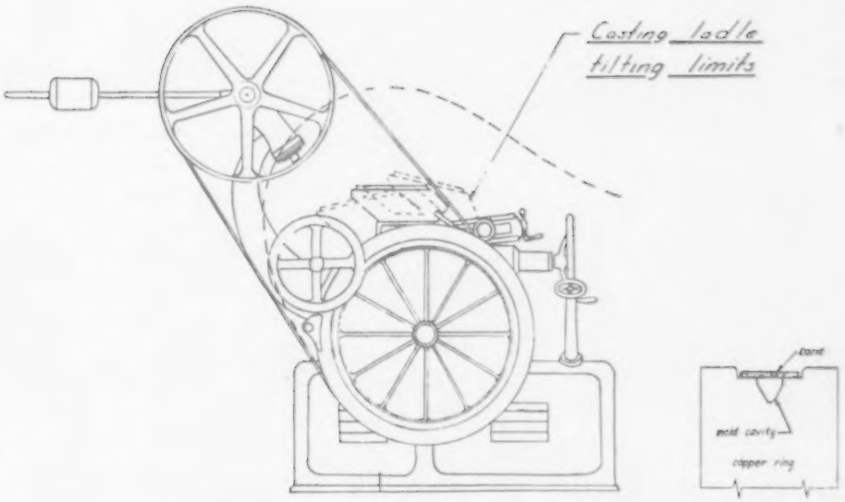


FIG. 1—Schematic view of the Properzi continuous casting machine. The extent to which the ladle can be tilted is indicated. A cross-section of the mold cavity cut in the copper ring appears at the right. The steel band is tightly stretched around the casting wheel to form the third side of the mold.

steel band—copper mold junction. The molten stream is fed into the mold cavity tangentially and in a down direction.

The ladle feeding the spout is 22x8x4 in. deep and holds about 20 lb of metal. This refractory-lined container is under-fired with a gas flame from one side. The hot gases sweep under the length of the ladle and are exhausted along the spout, so that the spout is heated at all times to prevent metal solidification or temperature loss.

Pouring Temperature Controlled

The pouring temperature at the melting furnaces is 1275° to 1285°F. Immersion thermocouples connected to automatic recording pyrometers control tapping temperature. The runout troughs from the melting furnaces are not heated. The holding furnace pours at 1220° to 1240°F and this temperature is maintained in the ladle and through the spout and is the temperature at which the metal is fed into the wheel mold cavity.

The melting furnaces are not fully emptied. They tap only enough metal to maintain a suitable charge in the holding furnace. There is considerable flexibility in furnace operation as the only *must* in the entire metal feeding procedure is that the ladle on top of the casting machine be kept reasonably full.

Solidification is fast in this process. Two sides of the mold are formed by the copper cavity and the third side is the steel band. The water inside the wheel plus the water circulating in the outside tank extract the heat from the mold.

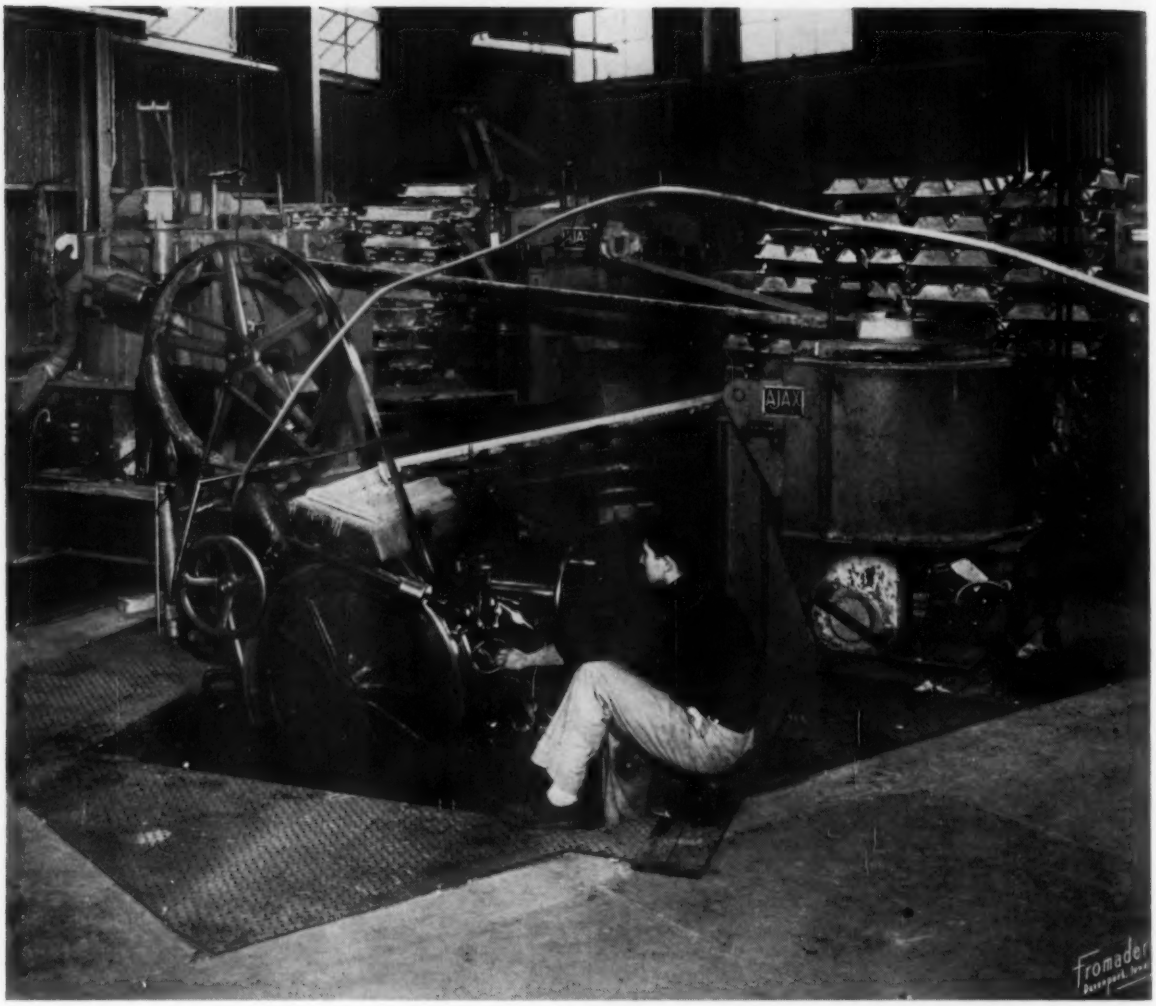
The operator adjusts the casting speed and the tilt of the machine and/or the spout to produce optimum casting rates and control of section. An oil film is run onto the outside of the steel band opposite the point at which the metal is fed into the wheel mold. White lead is mixed with the oil and speed of casting is regulated by the oil evaporation pattern formed on the outside of the steel band.

The cast section travels with the wheel to a point part way up the side opposite the operator. A stripping device then ejects the section to one side and the section loops back over the operator's position into the first pass of the mill. Cotton waste wipers clean and dry both the band and the mold cavity before again receiving a molten charge.

The ⅞-in. triangular section was chosen because it is the simplest shape to extract from a wheel mold. Also this shape is the best section for the subsequent 3-roll rolling pass de-

How it came to America

Frank Nichols, president of Nichols Wire & Aluminum Co., happened to see a short notice of the Properzi machine in a foreign magazine. Within a week he dispatched two men to Milan, Italy, to see it. F. P. Leahey, executive vice-president, and M. J. Fey, chief engineer of the company, telephoned back to Davenport, Ia., some days later that the machine had considerable merit. Mr. Nichols instructed them to buy both the casting machine and the rolling mill and the deal was closed then and there.



THE THREE FURNACES and the casting machines require very little space. The cast bar feeds back over the operator's head into a 15-stand continuous rolling mill which produces coiled rod.

sign of the continuous mill. It was thought by the designers that alternate triangular and circular passes have advantages over the traditional square-oval methods. The performance of the product and the mill operation itself appear to fully confirm this belief. Other reasons for the cast shape and odd roll pass design will be discussed later.

Casting Is Self Stripping

Two corners of the triangular cast section were modified to facilitate positive stripping from the wheel mold. The straight-line contour is short and does not interfere with filling out the first roughing pass of the mill. Once the cast section is started, the operation is continuous. The section is not broken and the section automatically strips itself from the wheel and feeds directly into the rolling mill.

The only scrap regularly encountered is at the beginning or end of a production run. At times improper control of metal feed on the machine may cause a break in the cast section, but usually the unit works continuously. At present the process only runs for 8 hr a day but it could run around the clock if so desired.

No artificial shielding from air of the molten stream from melting to holding furnace or holding to spout is needed. The aluminum forms its own protective envelope or sock and the metal fed into the mold runs through this natural sock at all times and is fully protected from oxidation.

Part II of the article will appear in next week's issue of The Iron Age. The second article will include the 15-stand continuous rolling mill plus a macro etch study of the rolled rod and mechanical properties of wire drawn from the rod made by this continuous process.

Machining integrally-stiffened sheet from plate will have extensive application, despite high loss in chips. Elaborate equipment is not essential, though machines with special features will be needed to bring cost and machining time down. Machining is now in use to make production and experimental structure, and to simulate structure which will eventually be produced by other means.

INTEGRALLY-STIFFENED SKIN REVOLUTIONIZES AIRCRAFT CONSTRUCTION

machined sections

THIRD OF A SERIES

Machining from thick plate provides a ready means of making integrally-stiffened structure. It is highly flexible, permitting variations in section to incorporate taper, local reinforcements, integral doublers, and heavy attachment panels. The simple rectangular stiffener shape available by machining is generally considered poor from a structural standpoint. But this disadvantage is offset by freedom to reduce stiffener spacing and thus make the skin more effective under compression. Applications to date have shown substantial weight savings.

The size of machined parts is limited only by size of machining equipment and material. Large size parts with any desired taper eliminate the need for splices and so save both their cost and weight.

The one great disadvantage of machining is that 75 to 95 pct of the original material is cut away in chips. Cost of raw material is therefore high. Machining time is also high, with present equipment.

In spite of this, machining from plate will, in certain applications, show cost advantage as well as simplification and weight savings, over conventional structure.

High-speed equipment and methods now used extensively in milling aircraft parts have greatly increased the practicability and potentialities of machining as a primary method of fabrication. Machining may be used to duplicate any other type of integral stiffening for experimental study or for prototype construction. When extruded and forged integrally-stiffened designs become available, it may be desirable to apply the same machining methods to reduce skin thicknesses and incorporate taper, local trim and reinforcement pads.

End Milling Is Practical

The most readily applied method of machining integrally-stiffened sheet is that of end-milling—milling with the axis of the cutting tool perpendicular to the machined surface.

Elaborate equipment is not essential. Fig. 11 shows the manufacture of a bulkhead rib for an integral fuel tank. This operation was done

By P. E. SANDORFF, *Research Engineer*
and GEORGE W. PAPEN, *Mgr., Production Engineering Dept.*
Lockheed Aircraft Corp., Burbank, Calif.

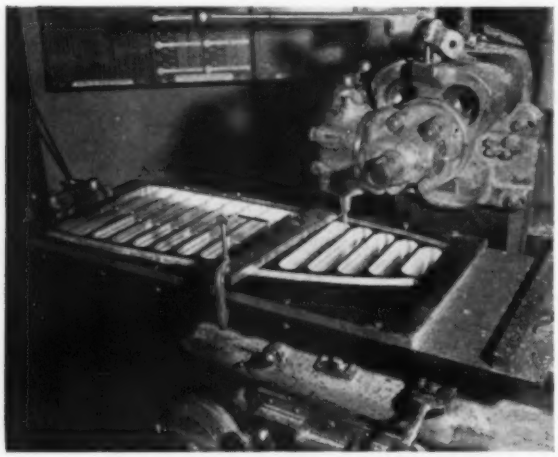


FIG. 11—Setup for machining an experimental bulkhead rib for an integral wing tank. Material is thick aluminum plate.

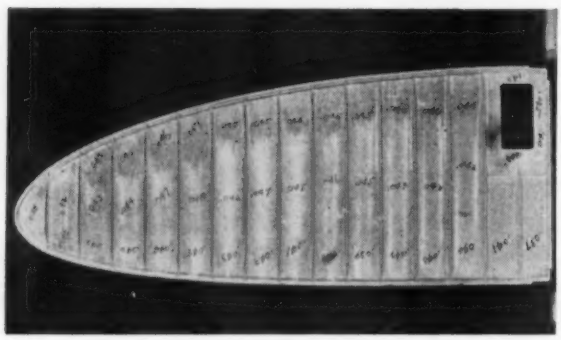
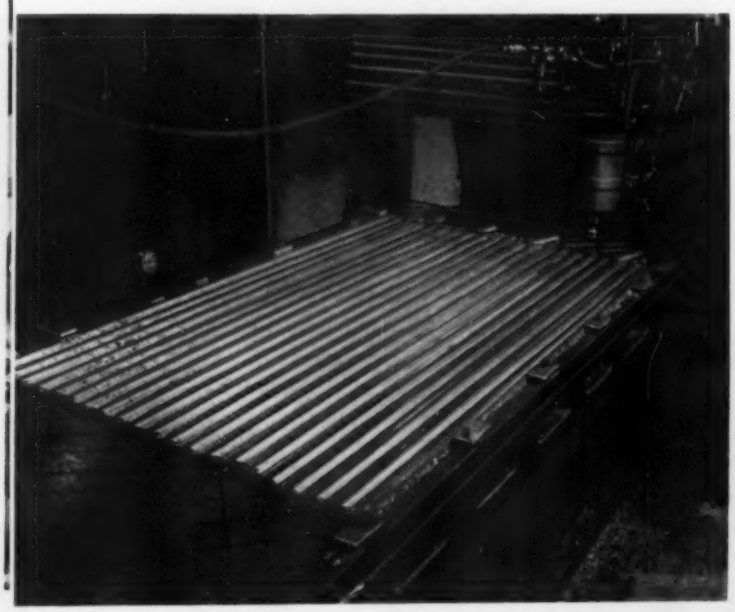


FIG. 12—Experimental integral tank bulkhead rib machined from plate on setup shown in Fig. 11. Web, stiffeners, flanges and doubler pad are all one piece. Machining permits convenient tapering of web thickness as desired.

FIG. 13—Machining integrally-stiffened sheet on a modified planer. Vacuum bed holds down workpiece.



on a small Milwaukee milling machine with standard cutters and accepted methods. The finished part, shown in Fig. 12, is equivalent to a 13-piece assembly in conventional construction. For production, a Cincinnati Hydrotel or other high-speed duplicating machine would be more practical than the method illustrated.

By using high-speed cutting heads and special beds the machining time can be considerably reduced. Fig. 13 shows a modified 16-ft planer which is used at Lockheed for experimental manufacture of integrally-stiffened sheet. A high-cycle motor is mounted on one of the planer heads driving a fly-cutter or end mill at a speed of about 10,000 rpm.

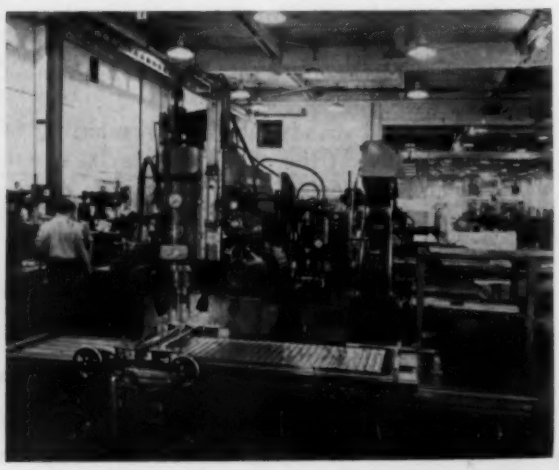
Fig. 14 illustrates machining of an experimental leading edge structure, equivalent to that used on the Constellation outer wing, which was machined from ¼-in. plate. The skin is of 0.040 in. nominal thickness, and a doubler pad 0.072-in. thick is left on all edges to simplify attachment. Forming of this part to curvature is accomplished after machining by repeated bumping on a power brake. Rolling has also been used for similar sections.

Slab Milling Has Advantages

For rapid removal of a large mass of metal, slab milling is much better suited than fly-cutting or end milling. The advantages are apparent chiefly for quantity production because heavier equipment and higher horsepower are available. The process is generally less flexible in application.

For the machining of integrally-stiffened surfaces Onsrud spar-milling equipment has been applied with excellent results. F.g. 15 shows a 75-ft spar mill in operation machining a span-length wing panel from ⅞-in. plate. The skin thickness of the finished part tapers from 0.091 to 0.045 in. The depth of cut is cam guided and is accurate to within a few thousandths of an

FIG. 14—Setup for machining an experimental leading edge panel from ¼-in. aluminum plate. After machining, sheet with integral stiffeners is trimmed and formed to contour.



inch. Taper in skin thickness as well as local reinforcements and integral pads for end-attachments are readily obtained. Details of the machine setup are shown in Fig. 16.

Contour Machining Studied

Discussion thus far has been limited to the production of flat integrally-stiffened panels. However, most applications will undoubtedly require contoured surfaces. The forming of flat integrally-stiffened panels to required contour will be discussed in another part of this article. Machining to required contour has also been investigated. It has been suggested that plate of the required cross-section thickness be formed to contour and then machined to final shape. This naturally would require less machining time and conserve material over machining from a solid billet large enough to encompass the curvature. The type of equipment required to machine to the contoured shape must of necessity be a high-speed duplicating type machine based on the Keller or Hydrotel principle. The best that is expected of this type equipment is only a slight improvement on the end-mill type operation. Consequently the machining operation would be slow and costly.

Whether or not machining from billet or rolled flat stock to the finished shape proves feasible and economical, it will probably be desirable to do some trimming and finish-machining on parts conforming to contour. Forging integral panels to finished contour with subsequent machining for joints and other areas requiring closer tolerances than can be maintained by forging appears feasible. It is believed that high production equipment capable of machining a finished formed integrally-stiffened part should be developed.

A most useful piece of special equipment in machining thin-skinned sections to close tolerances is the vacuum-clutch bed plate. The vacuum plates designed and constructed at Lockheed may be seen in Figs. 13 and 16. They consist of a network of narrow surface grooves fed internally to a vacuum system. The sheet to be machined is fixed to the bed plates with a few mechanical hold-down clamps and sealed around all edges with zinc chromate filleting putty. With this arrangement, skin as thin as 0.016 in., accurate to ±0.002 in., is obtained.

Use Stretcher-Leveled Stock

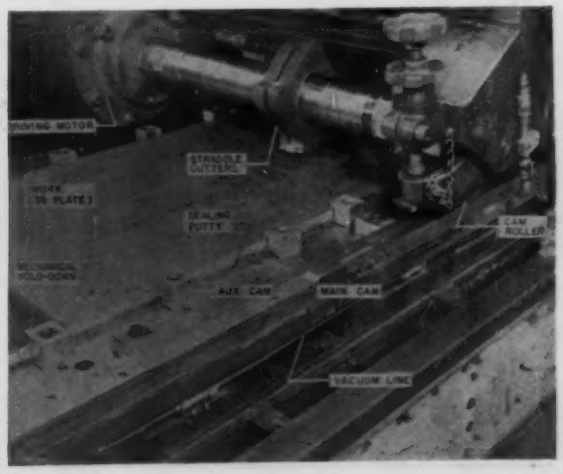
The use of a roller hold-down to apply a concentrated hold-down force adjacent to the cutter was investigated and found to be of questionable value. To make thick plate lie flat, the loads which the roller hold-down must apply are so large as to introduce severe machine design problems. For thin plate the vacuum plate appears more satisfactory.

An important practice introduced by Lockheed which greatly reduces the problems of warpage is the use of stretcher-levelled plate stock. If the finished, machined part before removal from the flat bed of the machine contains unbalanced internal stresses it will warp when the hold-down clamps are removed. Such unbalanced stresses may arise from two sources: The plate before machining may contain locked-up residual stresses and the machining operation may introduce a stress condition. Early experiments at Lockheed indicated that when proper cutters were used, virtually all of the warping was caused by the residual stress which existed in the plate before machining. A study was made to determine the exact residual stress distribution in as-rolled and in stretcher-levelled plate and the results proved the value of the stretcher-levelling operation. All plate up to 0.375 in. are now stretcher-leveled. Thicker plates are roller leveled.

Unfortunately plate no thicker than ⅞ in. can

FIG. 15—A 75-ft spar mill being used to machine integrally-stiffened sheet from ⅞-in. plate. Taper in skin thickness, and local reinforcements and attachment pads are readily obtained with this setup.

FIG. 16—Details of the spar mill setup for machining integrally-stiffened structure. Depth of cut, cam-guided, is accurate to within a few thousandths. Though mechanical clamps are used, workpiece is mainly held by vacuum bed.



be obtained in the stretcher-levelled condition at present, and such plate is limited to about 3 ft in width and 24 ft in length.

An experimental wing structure has been constructed of machined surface panels. This assembly was made interchangeable with the long-range Constellation outer wing which also serves as an integral tank for carrying fuel. Using data obtained in the construction of this wing, a complete study was made of the value of the machining process in its present stage of development, as compared with conventional methods, for producing this type of structure. The following conclusions were reached.

Conclusions Are Significant

The external surfaces of the machined structure are exceptionally smooth and free of rivets. No skin buckling occurs under any design load condition. All splices and bulkhead flange attachments are made with a single row of rivets through thick skin pads which are integral with the panels. On removable doors a ⅛-in. thick flange is provided. There are no chordwise splices over the entire 20-ft span. The machined taper in skin thickness and stiffener height provides optimum structural properties at all stations.

With the machined integrally-stiffened structure, a weight saving of 230 lb per airplane was realized. This amounted to 25 pct of the weight of the structure subject to redesign. Half of this was due to structural weight saved by elimination of splices and by more efficient use of material; half was due to weight of fuel tank sealing compound saved at stiffener-skin attachments.

TABLE II

MACHINED STRUCTURE V. CONVENTIONAL CONSTRUCTION

Outer Wing Structure

Pct of Total Cost of Conventional Design

	Conventional Structure	Machined Integrally-Stiffened Structure
Fabrication	7	17
Assembly	38	20
Tooling	21	29
Raw Material	16	25
Sealing	18	14
Total	100	105

On the basis of production of 50 items, the comparison of costs was estimated as shown in Table II. Assembly cost—the major cost item in conventional airplane construction—is greatly reduced by integrally-stiffened design. But current methods of machining, it is seen, involve increased fabrication, tooling and material costs which at present over-balance the saving in assembly.

Further Study Indicated

The cost data obtained in this case clearly show that further development should be directed at reducing raw material cost and speeding up the machining process. Tooling costs may also be worthy of attention. In quantity production, however, more elaborate tooling would be justified.

In machining surface panels from thick aluminum alloy plate, 80 to 95 pct of the original stock is cut away in chips and trim. Chips have low salvage value. There is therefore an advantage in machining from an outline section which might be prepared, for example, by forging or extrusion.

It is probable that more economical methods for reclaiming chips will be developed if machining practices are adopted extensively. But even when machining from plate shows considerable dollar advantage to the airframe manufacturer, consideration should be given to material transportation and mill processing problems which might occur in case of national emergency.

Machining time and cost of machining would be considerably less if equipment more suited to fabrication of surface panels were available. Automatic control would also be an advantage. A machine of this type is being built by Giddings & Lewis Machine Tool Co., Fond-du-Lac, Wis.

What kind of machines?

Lockheed engineers list the following as features they would like to see in a machine tool designed especially for machining integrally-stiffened structure:

Vacuum bed 72 in. or more in width, 40 ft long.

Power feed for machining across either dimension of the bed.

Accuracy of indexing cutter head to 0.010 in. in any horizontal direction, and 0.005 vertically.

Fifty horsepower, 20,000 rpm, end milling head.

Five-hundred horsepower, 5000 rpm, drive for slab milling plate stock with gang cutters.

Completely automatic system for sequencing, actuating and controlling depth and location of all cutting operations.

CONTINUOUS STRIP EXPERIMENTALLY ROLLED FROM POWDER PART II

Sheet made of rolled and sintered iron powder requires cold rolling and annealing, and it can be made into steel by carburizing and other methods. While present powder costs are high, there has been no incentive to develop large-scale production methods. This is a translation of a German paper written by Dr. Franz Zirm, which appeared in Stahl und Eisen, vol. 70, 1950.

Metal powder parts that are produced by pressing in molds are generally not given further processing after sintering. Some porosity is often desirable. When higher tensile and rupturing strength is required, a post-pressing at high temperatures and a subsequent sintering is necessary. This method is customary when producing parts from sinter steel. In the case of strip and sheet, such post-compacting is absolutely necessary unless a porous structure is required.

Several of these subsequent rolling passes are required. The percentage of reduction in the first rolling pass given strip and sheet after sintering should not exceed a certain amount. Otherwise, transverse cracks occur. This limit would seem to be about 30 pct, for strips of the thickness of those on which tests were conducted. Subsequent passes, after intermediate heat treatment, are limited to 10 to 20 pct reductions. After the fourth pass, the strip can be handled like regularly produced sheet and can even be given a heavy cold reduction.

In Part I, which appeared in the issue of Feb. 1, 1951, the relationships between various rolling factors, particle size, density and nonsintered properties were discussed. The quick sintering method developed during these investigations was described.—Ed.

The progressive changes in density and thickness occurring in pressed and sintered strip of varying initial density and thickness (0.45 to 0.55 mm) with increasing reduction is shown in Fig. 6. The degree of reduction for each pass is also indicated. The greater reduction that took place in the first pass is due to the reduction of the considerable pore space remaining after the original forming and sintering of the strip. With the fourth pass, the density of soft iron is almost attained.

Annealed Between Rolling Passes

In between the cold rolling passes, the test strips, which were about 400-mm long and 100-mm wide, were annealed for a short time in a muffle-type furnace through which hydrogen gas was passing. This furnace ended in a water-cooled cooling zone. A final annealing for stress relief was given after the last pass. This experimental arrangement resembled what might be a suitable organization of rolling stands, sintering and annealing furnaces and other equipment in a full-scale continuous process.

The increases in tensile strength and elongation caused by successive rolling passes are shown

TRANSLATED BY B. M. PEARSON, Hassocks, Sussex, England, from Stahl und Eisen, vol. 70, No. 22, dated Oct. 26, 1950. Part I of this story in The Iron Age, Feb. 1, was also translated from this paper written by Dr. Franz Zirm.

in Fig. 7. The curves representing these properties show a similarity in their nature and resemble those determined by W. Eilender and R. Schwalbe[6], describing the influence of sintering time on tensile strength and elongation. As can be seen from the curves in Fig. 7, the tensile strength rises rapidly up to the fourth reduction pass and increases only slightly thereafter, tending to reach a permanent maximum value. This value roughly corresponds to the tensile strength calculated from the chemical composition of the test strips. The reason for this is probably the changed density of the materials, which generally characterizes the number of pores present.

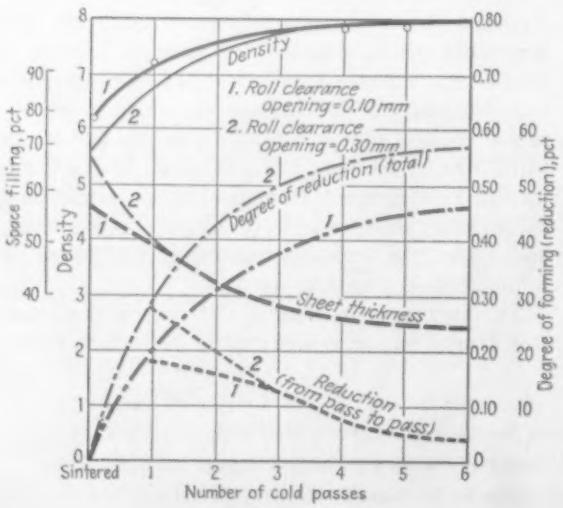
Higher Elongation Requires More Passes

From the curve in Fig. 6, it can be seen that density rises more after the first pass than with any of those following. The increase is greater than that which occurs in tensile strength. As the structure of the material becomes pore-free it not only becomes greatly strengthened but, also, the notch effect recedes into the background. The strengthening effect may be ascribed to crystallization phenomena.

As for elongation values, these still change considerably even with the fifth pass, but after that point they also remain relatively the same. While a good tensile strength begins to be obtained with the third rolling pass, higher elongation requires at least five passes.

The strength increase in the test pieces after each of the cold passes was measured before annealing, Fig. 8. Although the first cold pass does improve strength, as compared with the sintered condition, an additional increase is effected by the annealing following it (from 8 to 20 kg per sq mm). This first annealing is the only one that

FIG. 6—Change effected in density, thickness and percentage of reduction with each cold-rolling pass. Annealed after each pass.



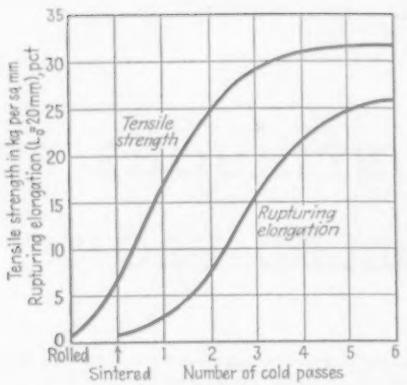


FIG. 7—Influence of increasing deformation on tensile strength and elongation.

causes such an increase, and is due to a continuation of the sintering process, particularly of the secondary particles which are brought closer together by the initial cold-rolling.

With the second cold pass, a work hardening can already be discerned, for the tensile strength rises from 20 to about 44 kg per sq mm. A relaxing effect takes place after the subsequent annealing to about 27 kg per sq mm. With additional cold-rolling and annealing, the tensile strength gradually rises to the maximum permitted by the composition.

Lower Annealing Temperature Used

Determining the temperature at which the final heat treatment of the cold-rolled strip should be performed requires consideration of a characteristic property of synthetic bodies. This is the increased grain growth at certain sintering temperatures[6, 8], the opposite of the case with normally produced metals. Strength and other properties are strongly influenced by this annealing for stress relief. To prevent the coarsening of grain size which starts at temperatures of 850 to 900°C, lower temperatures are used (about 650°C). In this way, stresses introduced by the cold rolling are removed and the structure of the strip is recrystallized without any coarsening of the grain.

The grain size and the distribution of that grain size also greatly influences processing behavior and mechanical properties. The finer powders with uniform particle size distribution gave the best results. Coarse grained sieved fractions, whose fine fraction was not lower than 0.06 mm, gave the lowest values. According to the results in Table II, with increasing deformation the differences in tensile strength balance out up to a certain degree. However, from the standpoint of processing behavior, normal powder with a particle size of 0.30 mm was the best. This is in conformity with results of previous work.

Tests of the deep drawing and bending properties of the specimen strips were made according to German standards for similar materials. The results, Table III, indicate that the speci-

men strips satisfied this requirement.

Backward and forward bend cycle tests of the strip revealed outstanding results. Bend cycle figures of 50 to 200 were recorded, and the best values were obtained with strips prepared from powder of normal sieve classification.

According to F. Sauerwald and J. Hunczek[9] and F. Sauerwald and S. Kubik[10], if the initial forming of the strip and sheet could be a hot operation or if a hot pass could be given the pressed strip immediately before sintering, a very high degree of compacting would be reached. A more extensive removal of porosity and the consequent improved density would increase tensile strength and elongation. Unfortunately, such experiments could not be conducted, as the thin test strips produced cooled off too quickly in the cooled rolls. These rolls were running fairly slowly.

However, a single test was made on a reversing two-roll stand (roll diameter, 900 mm) which clearly indicated the value of such hot compacting. A press strip about 9 mm thick, with a density of 5.55 g per cc, was subjected to a hot rolling, producing a 43 pct reduction. The density increased to 7.45 g per cc and the elongation value was found to be 14 pct. Another sample of the same material that was given a cold pass showed only 2 pct elongation.

Equipment Layout Described

How equipment for the continuous production of sheet and strip from iron powder might be laid out is shown in Fig. 9. Horizontally arranged, parallel forming rolls receive the metal powder from a hopper, forming it into a pressed strip which is sintered in a protective atmosphere. The sintered material then passes through any desired sequence of cold passes and annealings, with a final relaxing heat treatment.

Various possibilities exist for the direct rolling of metal powders of these materials which either wholly or in part cannot be produced by normal ingot-and-rolling-mill methods. For example, there are three possible ways in which steel sheet can be produced: from steel powder, from mixtures of soft iron powder and carbon carriers such as graphite, or from carburized soft iron press strips. As experience in the production of sinter steel parts by powder metallurgy[4, 11] indicates, carburization of the press-strip is most suitable. The thin cross-section of the strip and sheet produced from metal powder makes this particularly desirable.

FIG. 8—Change in tensile strength caused by each cold-rolling pass and its subsequent annealing pass.

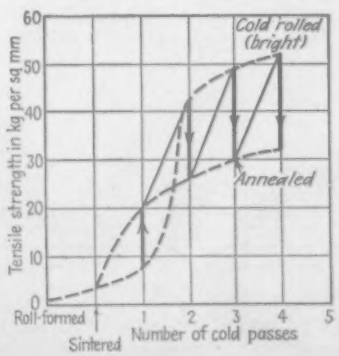


TABLE II
TENSILE STRENGTHS AND PARTICLE SIZES

	Particle Size in mm					
	<0.30	0.15 to 0.30	0.06 to 0.30	<0.15	0.06 to 0.15	<0.06
	Tensile Strength in kg/sq mm					
Sintered	8.2	4.2	4.3	8.8	6.6	n. o.
1st Pass	20.5	19.7	14.4	22.4	n. o.	18.1
2nd Pass	30.0	27.3	23.2	29.9	25.2	n. o.
3rd Pass	30.6	29.7	27.9	31.8	28.6	31.0

n. o.—Not observed.

TABLE III
RESULTS OF DEEP DRAWING TESTS

Particle Size, mm	Sheet Thickness, mm	Depth, mm
<0.30	0.25	6.9
<0.30	0.24	7.1
<0.15	0.29	8.1

Carburization was effected with coke-oven gas and tests were conducted at various temperatures, with and without the addition of the benzene vapor used as the protective atmosphere. Carbon was absorbed in a very short time, Fig. 10. After one minute at 1100°C, carbon content rose from 0.02 to 0.8 pct, and at 1200°C to 1.3 pct. This produced rollable strip with high tensile strength. Microscopic examination of a test piece, treated at 1200°C in coke-oven gas with benzene vapor added and containing 1.33 pct carbon, showed a good carburized structure. Pores were completely absent and the grain boundaries were sharply defined and completely individual, indicating a normal structure. Needles inside the grains were apparently caused by the high carbon content and rapid cooling. RZ powder provided the best results in these tests, as against electrolytic and carbonyl powders, which behave anomalously in this respect[12].

Made Iron Into Steel by Carburizing

The tests indicated that obtaining a required degree of carburization by conducting the sintering and reheating of soft iron strip in a carbon-containing atmosphere is technically possible. Detailed research is still needed to determine the best possible composition of the gaseous carburizing atmosphere for optimum results in the short heating time that would have to be used.

A special arrangement of the feeding hopper in front of the forming rolls was used to produce a compound, multi-layered sheet from powders of different chemical compositions. A 2 pct C steel powder was given outer layers of soft iron,

the resulting sandwich being rolled into a homogeneous sheet. Diffusion and increasing deformation tended to make the carbon migrate to the outer layers low in carbon. To prevent decarburization, nitrogen was used as a protective atmosphere.

The chromium and aluminum oxides, which cannot be reduced by hydrogen and are stable when formed, create difficulties in the sintering stage. For this reason, when using such materials to produce high-alloy sheet from metal powders it is necessary and relatively easy to bring the strip to very high temperatures with an electrical current. A hot pass under hydrogen is also likely to be required and would not be difficult to apply.

Since iron powder can be decarburized to a very considerable extent by treatment with hydrogen, this sinter-metallurgical process also offers special advantages in the manufacturing of magnetically soft iron. The good magnetic properties of electrolytic iron powder can be improved by the addition of proper elements and should prove outstandingly suitable.

Bronze Powder Also Made Into Sheet

As to other metals, up to now only bronze powder has been investigated and it has been successfully made into sheet by the methods already described.

Various German technicians have given their opinions on this application of continuous processes to powder metallurgy. They consider that the work represents a decisive step forward because many of those sizes of sintered products that could not be made up to the present can now be produced by the new method. In addition, other workers have performed experiments which confirm the present findings.

It has also been demonstrated that for every

TABLE IV
PRODUCTION COSTS VS. MONTHLY OUTPUT

Production of Iron Powder tons/month	Method of Production	Production Costs per Ton Iron Powder	
		German Marks	U. S. Dollars
5	Hematite crude iron—electric furnace	1,200 to 1,300	285.60 to 304.40
50	Hematite crude iron—electric furnace	600 to 650	142.80 to 154.70
500	Basic Bessemer Steel and Carburization	275 to 300	65.45 to 71.40
5,000	Basic Bessemer Steel and Carburization	170 to 190	40.46 to 45.22

sheet thickness there is an applicable roll diameter, powder size and degree of compacting. With RZ powders, it has been found that the most suitable ratio between sheet thickness and roll diameter is 1 to 100.

It was felt that special emphasis must be placed on the characteristics of the powders used. Good flow properties are especially important. RZ powder is more suitable than powder consisting of scale or plate-shaped particles. With these latter types, there is always a danger that if the powder feed should slacken, non-uniform thickness and irregularities will occur in the sheet. The angle of rest of such powders varies according to the geometrical arrangement of their particles. If attempts are made to achieve uniform thickness in faulty sheet made of these powders by further passes, even with interannealing, a tendency to cracking will be encountered.

Heating by Electrical Resistance Questioned

One technician has disagreed with the suggestion that direct electrical resistance heating through the press strip could be used to provide the required sintering heat. As is well known, the specific resistance of sinter metal bodies decreases with progressive sintering effect. Insufficient resistance to develop the necessary heating effect would occur precisely at that point where a high power loading would be needed.

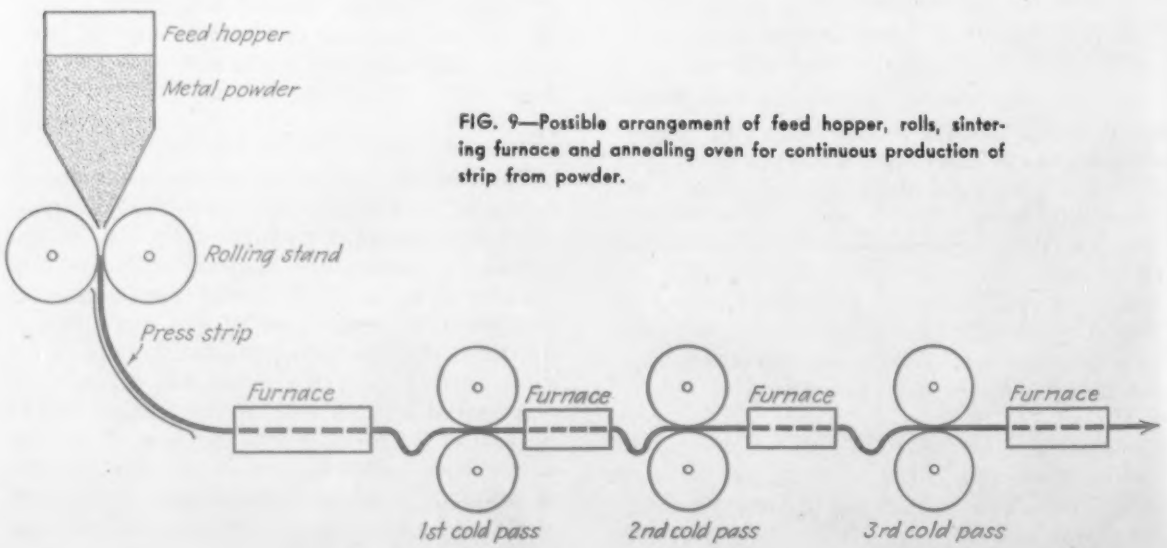


FIG. 9—Possible arrangement of feed hopper, rolls, sintering furnace and annealing oven for continuous production of strip from powder.

Another approach to the sintering operation suggests performing this step as the powder is pressed between the rolls. Such a process has been developed in Germany under the name of the "Goldesel" process, embodying graphitic rolls. This equipment was originally designed for conducting reactions between oxides and carbon. Bars have been produced from iron powder about 10 mm in thickness.

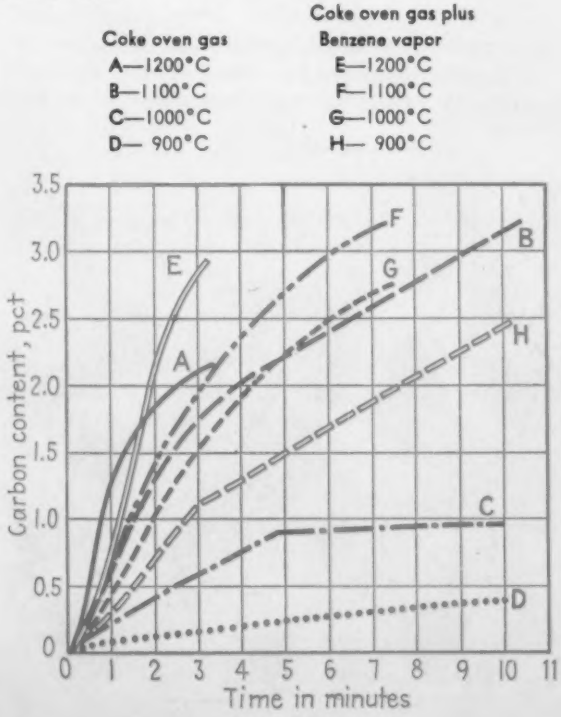
The graphitic rolls were placed in circuit with a high voltage transformer, and the greatest heating effect extended over about half of the narrowest part of the roll clearance. Care must be taken so that the temperature does not rise too high an amount. Otherwise, a reaction can occur between the iron powder and the graphite rolls to produce cast iron.

"Goldesel" Process Criticized

Another technician who stated that he is well acquainted with the Goldesel process has pointed out that if this type of equipment is used to process an iron powder having a considerably lower specific resistance than the graphite rolls it will be difficult to exercise control over the flow of current between the rolls. An impractically low voltage would be required with a correspondingly high current. This would not be feasible because the rolls would not be able to conduct that amount of current.

Some experiments based on the present findings were conducted at the Voeklingen steelworks and experimental iron powder strip was rolled. The results were in agreement with the work reported here. One fact was determined which amplifies the information developed to date. By sintering the press-strip in a hydrogen atmosphere, the carbon and sulfur contents dropped to less than 0.03 and 0.003 pct, respectively.

FIG. 10—Carburization of pressed, non-sintered iron strip to produce steel at varying temperatures and in different atmospheres.



The reason for tests being conducted in the Voeklingen works was less to develop a cheaper method of producing strip than to develop a bigger market for iron powder. Powder metallurgy suffers today from the too-high production costs involved in producing its raw materials. The consumption of iron powder by powder metallurgy parts manufacturers is so small at present than an iron or steelworks has little interest in producing this material.

Requires Large-Scale Powder Production

The development of full-scale production of sheet and strip from powder would change this present situation. Such a change would require an iron and steel works producing thousands of tons of iron powder a month. Production costs per ton, based on different monthly outputs have been estimated and are shown in Table IV.

Large scale production of iron powder from basic Bessemer steel could be achieved by carburizing the steel. The object would be to obtain a synthetic hematite crude iron that would then be atomized and heat treated. Should good ore factors be available that would permit the making of a hematite pig iron low in phosphorus, then under certain circumstances the cost figures given in Table IV could be still further reduced.

H. Hofmeister[13] has intimated that in certain cases strip for food containers could become a commercial proposition. He gives as an example those sulfur-containing ores and fuel which are unsuitable for processing in a blast furnace but which can be handled in a Stuerzelberg plant. The iron produced is then powdered and processed to strip, by-passing the steel-making and much of the rolling mill work.

Possible to Produce High Alloy Sheet

Special attention should also be given to high-alloy sheet. For example, Permalloy sheet can easily be made from powder. At the moment, unfortunately, technical difficulties are encountered in the production of electrical resistance heating strip, but these may be overcome. A favorable feature here is the fact that direct electrical heating will permit very high sintering temperatures to be used.

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DIECASTING MACHINES FED AUTOMATICALLY

Electromagnetic molten metal pumps feed metal directly into diecasting machines, eliminating the hand ladling formerly used. Two pumps act as holding furnaces, receiving metal from one melting unit and insuring a uniform supply of molten metal at constant temperature to two cold chamber machines.

By **HERBERT CHASE**
Consultant, Forest Hills, N. Y.

Within recent months, the production of electrical connectors has become a major activity at the Scintilla Magneto Div., Bendix Aviation Corp., Sidney, N. Y. Such connectors, made in many sizes and patterns, each involve two or more die cast aluminum shell-like components surrounding and supporting one or more dielectric insulators; the insulators are molded from a flexible plastic called Scinflex. Holes cored in the plastic inserts position the current-carrying contacts and hold the latter in correct relative position.

As the connectors are employed primarily in aircraft where lives depend upon correct functioning of electrical equipment, exacting specifications have to be met and products of highest quality are essential. To attain this and at the same time realize economy in manufacture while still holding high production schedules, Scintilla has recently installed one of the latest and most advanced setups for die casting the shell-like components. Typical examples of these castings appear in Fig. 1; at the center is shown a gate of four castings attached to the runners and "biscuit," as the casting comes from the die.

Most of the castings have sections ranging from 1/16 to ¼ in. in thickness and are cored out to receive the plastic insulators. Some types include elbows that are cored from both ends. All castings have to be sound and high pressure is required to fill out the one to four impressions in a given die or set of die blocks. Many dies are of the unit type and are inter-

FIG. 1—Typical diecast aluminum connector components and a gate of castings as it comes from the die. Flash is not removed from some of the castings shown.

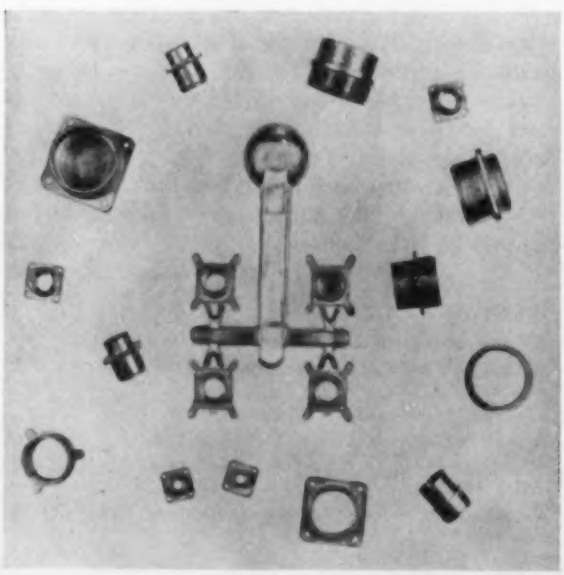
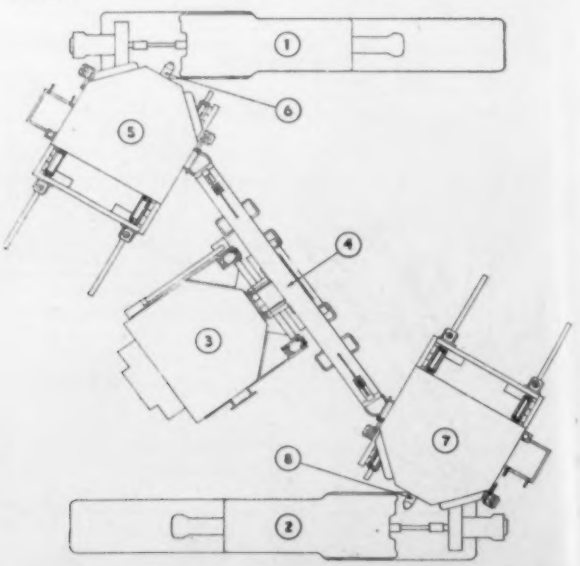


FIG. 2—Layout of melting, pumping and casting units: (1, 2) diecasting machines; (3) melting furnace; (4) heated runway; (5, 7) electromagnetic pumps; and (6, 8) pump nozzles.



changeable in common holders which accommodate either one, two or four blocks.

To insure castings of uniform quality and at the same time to attain a high production rate, it is essential to supply the metal at a uniform temperature. It is also desirable to eliminate the human variables involved in hand ladling metal into the cold chamber of the casting machine and to make the casting cycle fully automatic. By these means, even the minor variations in timing and in volume of metal fed can be virtually eliminated.

Gives Close Control

To attain these conditions, two of the latest type Lester-Phoenix casting machines were installed, along with a set of three Ajax low frequency induction furnaces. The furnaces are also of the latest design, capable of supplying molten aluminum within exceptionally close temperature limits. One of these furnaces melts the aluminum and feeds it as required to the two electromagnetic pumps one of which is adjacent to each casting machine, as shown in Fig. 2. The melting furnace is located between the two electromagnetic pumps, the latter serving also as holding furnaces. An electrically heated runway of refractory material is used to transfer molten metal from the melter to the two pumps. The nozzles of the pumps discharge into the cold chambers of the two die casting machines.

Each electromagnetic pump is electrically interconnected with a precise timer and with the controls of the casting machine served, so that the pump discharges a predetermined weight of metal into the cold chamber at the precise and unvarying time in each cycle for which the automatic controls are set. There is, thus, close control of the weight and volume of metal injected as well as of its temperature. Moreover, injection is always at the same time in the cycle, which is set initially for optimum casting production.

No hand ladling is needed. Human variations in measuring the metal and in timing its application in the cycle are avoided. When the die has been spray lubricated, the operator merely presses a button that starts the cycle. This first causes the casting machine to close and lock the dies. Immediately thereafter, the timer operating the electromagnetic pump causes the latter to discharge the set weight of metal into the cold chamber. Then the ram advances and injects the metal into the die.

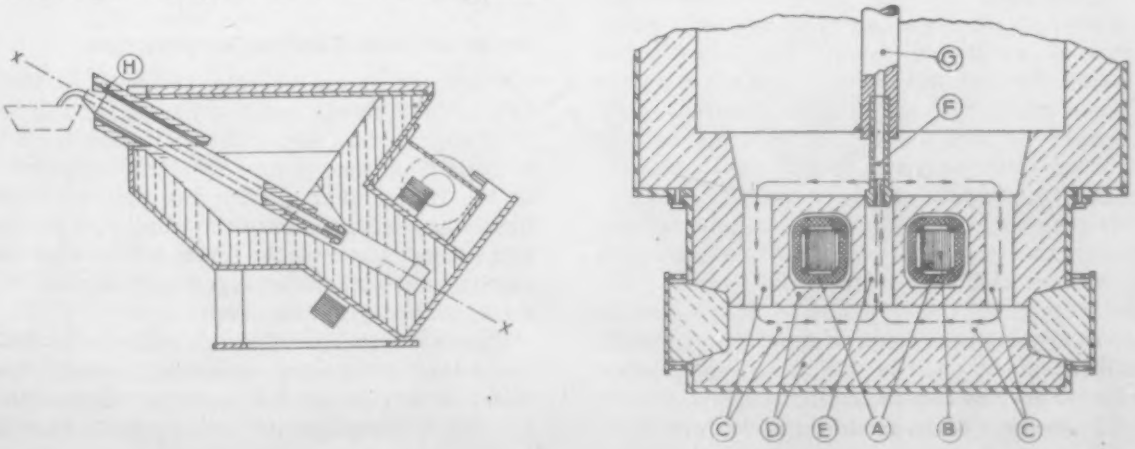
Of special interest is the construction and operation of the electromagnetic pump, because no mechanical pump is suited for handling molten aluminum at the temperature required. Moreover, if one was available, it would be most difficult to operate it intermittently and to vary the delivery to supply molten metal in precisely correct amount, especially during the short interval allowable in an efficient casting cycle.

Molten Metal Forms Secondary

Construction of the Ajax electromagnetic pump is illustrated in Fig. 3. The level of the molten metal in the hearth is at or near that shown, but varies somewhat as metal is pumped out and as a new supply is fed into the furnace. The level of the molten metal in the pumping nozzle (G) is higher and very near the tip, so that metal travels only a short distance every time a shot is made. Two primary coils (A) surround the laminated core (B) fed from an ac 60-cycle power source. The secondary consists of two loops of molten aluminum that fill the channels (C) and (E), as well as the hearth above them, the channels being inside the refractory (D) in the shaded area. High current on the order of 30,000 amp is induced in the secondary loops (E).

As there is a strong magnetic field with flux lines approximately circular around channel (E), the current in the fluid conductor causes it to move in the direction of the arrows. Elec-

FIG. 3—Sectional views, at right angles to each other, through the Ajax electromagnetic pump, which lifts molten metal and discharges it through a nozzle to the diecasting machine.



tromagnetic pressure is at a maximum in the channel at the top of which an orifice (F) is placed.

The rate of metal flow through this orifice depends upon the diameter of the orifice and the pressure inducing the flow. Actually, the orifice remains fixed; the pressure is varied by changing the voltage applied to the primary coils. Thus, the weight of metal poured can be varied by controlling the duration of current flow in the primary circuit. Connected to the orifice is a tube (G) made from silicon carbide refractory and surrounded, in its upper portion, by a resistance heating unit (H). The heating unit keeps the tube, where it is above the level of molten metal in the furnace, at the proper temperature up to the spout where the metal is discharged.

Depending on the size of the orifice, a metal flow ranging from ½ to 5 lb per sec can be attained. Consequently, timers are set to discharge a given weight of metal which the casting machine plunger immediately forces into the dies.

After a preset interval for the castings to solidify, the dies open automatically and the casting is pushed free. The operator merely lifts out the gate of castings and lays it in a tote box to cool. When this is done, the die is visually checked (and lubricated, if necessary) and the button starting the next cycle is pressed.

Output Increased 25 Pct

Metal injected always comes from the lower part of the hearth and is free of any dross or oxide such as may be introduced in hand ladling. Temperature is held within ± 5°F and is set at 1200°F for the SAE 306 aluminum alloy employed. Metal and casting conditions are so nearly perfect that the output of acceptable castings is upped about 25 pct over that for hand ladling. About 150 shots (die fillings) per hr are attained as against a maximum of about 120 per hr for fastest hand ladling. Such economies will soon amortize the higher initial cost of induction furnaces, electromagnetic pumps and their controls, besides yielding better castings. In addition, a marked reduction in rejects has been attained.

It requires only two men to operate the two casting machines and part of a third man's time to charge and tilt the melting furnace. The electromagnetic pump requires no production labor. Usually each electromagnetic pump needs refilling about once in 2 hr and this is done with little or no loss in casting time.

The melting furnace, shown at the center of

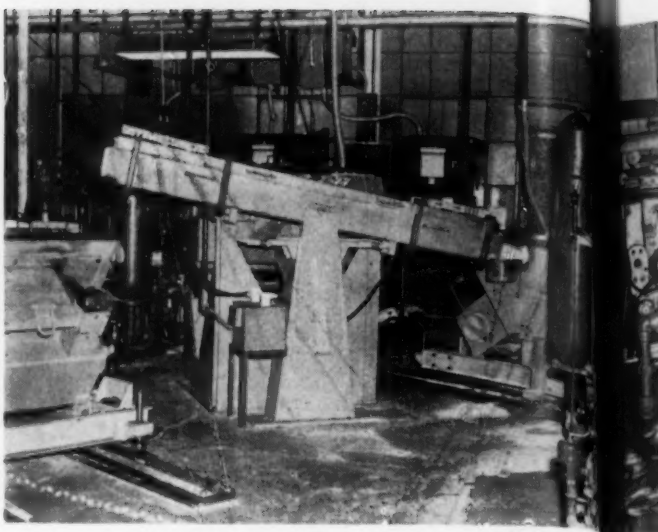


FIG. 4—Ajax melting furnace, center, and two electromagnetic pumps to which molten metal is fed through the electrically heated launder. Trough tilts either way and serves both pumps.

Fig. 4, is at a higher level than the two pumps and is set on trunnions for nose tilting. Directly below the spout is a covered refractory-lined trough or launder into which the metal is discharged when the furnace is tilted. This launder is electrically heated and is arranged so that it can be tilted one way to fill one pump and the opposite way to fill the other.

Each holding and pumping furnace is set on rails, positioned so that the pump nozzle is slightly above and to one side of the cold chamber filling opening. Metal discharges from the pump nozzle and flows down a trough, a distance of a few inches, directly into the cold chamber. This close coupling is important, and was attained by close cooperation between the designers of the die casting machines and of the electromagnetic pumps. A close-up of one electromagnetic pump appears in Fig. 5. As the case is well insulated and all heat is applied by the induction coil inside the base, very little heat is radiated and comfortable working conditions for the machine operator are assured.

Holds Uniform Casting Temperature

When the pumps operate, the level in their hearth falls slowly and the pumps tend to deliver slightly less metal. Compensation for this is made from time to time by slight adjustment of the timers that control the pumps. These timers are set to operate the pumps a fraction of a second longer as the levels fall, so that the quantity of metal discharged per impulse remains virtually unchanged.

Pumps discharge through silicon carbide tubes that are heated electrically so that the metal always issues at the casting temperature set. The electromagnetic pumps remain in fixed

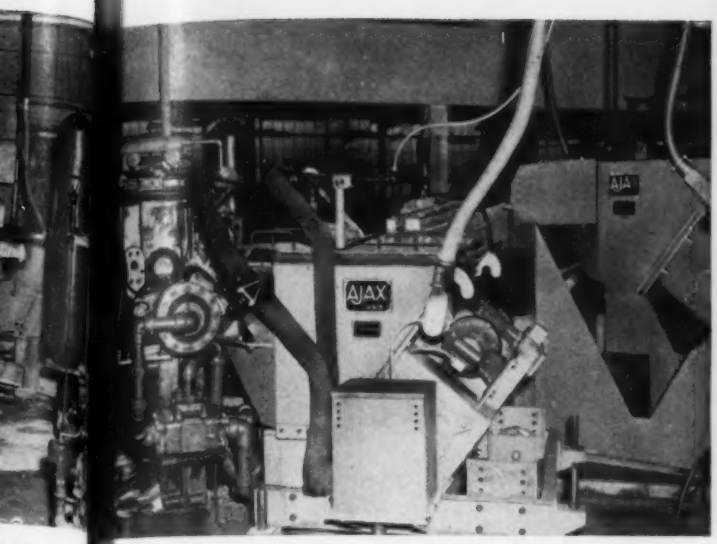


FIG. 5—Close-up of one electromagnetic pump, center, serving the diecasting machine at the left.

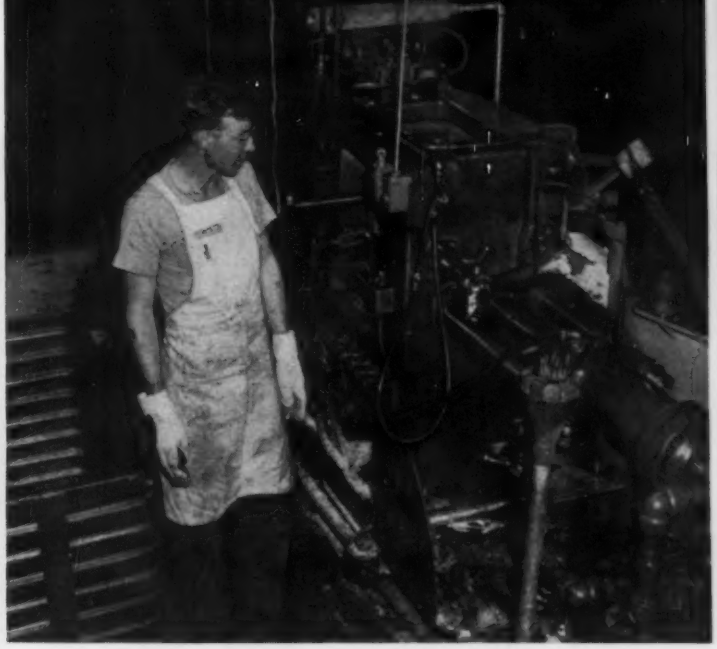


FIG. 6—Diecasting machine being charged with a measured quantity of molten metal from the pump. Automatic charging is followed by closing and locking of the dies.

position and need not be tilted. They also remain covered except when being filled. The pumps hold about 900 lb of aluminum alloy and the melting furnace about 1200 lb.

Some forty different dies are needed to produce the different castings required in the Scintilla line of electrical connectors. Most of these dies are small and are made to fit unit holders. In general, the dies have four cavities, all of which are filled at each shot of the machine. When both machines use four-cavity dies at a time, about 16,000 castings are produced in two 8-hr shifts.

Casting Cycle Is Automatic

Each of the new die casting machines, Fig. 6, are designated model HHP-1CC Lester and have automatic controls so that they run through the cycle automatically, unless stopped by the operator. In some cases, the operator uses a hand-operated ejector but in most cases knockouts operate automatically and the operator need only remove the gates of castings by hand. When side cores are needed, they can be arranged for either angle pin or hydraulic pulling, as desired. The machines are self-contained units equipped with hydraulic pumps that operate at 2000 psi. Rams in cold chambers are of 2-in. diam, hence, the pressure applied to the metal is about 11,000 psi. Total locking pressure applied to the dies is 150 tons.

This plant continues to operate two older and larger Lester-Phoenix machines, known as type HHP 3XS. These have 600-ton locking pressures and are employed for making castings of larger size than the connectors. With these machines, hand ladling is done from gas fired holding furnaces of 200-lb capacity, filled by hand from a 400-lb gas fired melting furnace.

With the large machines and hand-ladling, the number of die fillings ranges from 40 to 100 per hr, depending upon the size and type of casting produced. In many cases, inserts must be placed in the die by hand; this slows the cycle, but provides castings in which the inserts are held together in correct relative position in a manner attainable only by die casting.

Among the castings produced in this manner are magneto rotors, such as in Fig. 7, having a steel shaft and laminations as inserts. These inserts are clamped hydraulically or by air pressure in the die and are held securely while the aluminum alloy is cast around them. Thus, the casting operation effects an assembly and yields a product that would cost more if it had to be produced and assembled by other means.

Several of the castings made in the larger machines require side cores that are operated by the hydraulic system of the machine. The larger machines are equipped with prefilling arrangements. They also have nitrogen accumulators that step up the speed and pressure of the injection ram near the end of its stroke.

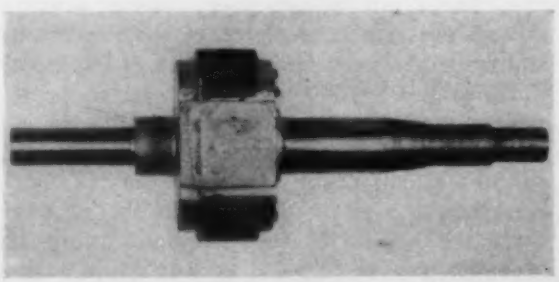


FIG. 7—Magneto rotor has a steel shaft and a set of steel laminations. These are applied as inserts in the die, bound together by diecasting aluminum around the inserts.

Operator installing Heli-Coil insert in retapped hole with a high-speed inserting tool.

The installed thread insert can be seen in place in the motor frame casting, left, half a turn below the surface.

Helical inserts speed thread repair in castings

The maintenance department serving one of New York City's subway lines has the frequent problem of replacing worn and stripped threads in the axle-cap bolt holes of its subway car motor-frame castings. Repair of these holes is expedited by the use of stainless steel helical-wire thread inserts.

These inserts permit the use of the same size cap screws in the repaired holes as were used in the original holes. This eliminates the matching operations that would be necessary if oversize threads and cap screws were used to solve the damaged thread problem. Use of these inserts also eliminates the need for drilling out larger clearance holes in mating parts. In addition, these preformed wire inserts provide threads that are stronger, more wear-resistant, and more corrosion-resistant than the original threads.

Thread repair is accomplished in the following manner: The damaged thread is cleaned out with a drill slightly larger in outside diameter than the major diameter of the original thread. The hole is then retapped using an oversize, special-threaded tap, and the helical thread insert is installed.

Threads in a motor frame were repaired in this manner. This casting had a badly worn thread, a completely stripped thread, and a broken 2¼-in. cap screw. Original holes had 1 9/32-7 tapped threads.

After removal of the broken stud, these three holes were repaired by drilling out with a 1 21/64-in. drill, tapping with a special oversize Heli-Coil tap identified with a 1 9/32-7 marking, and installing a stainless steel Heli-Coil thread insert to bring the hole back to size. This insert, having a diamond-shaped cross-section, has threads on its outside diameter conforming to the special tap and internal threads conforming to the original 1 9/32-7 thread.

The entire operation was completed in approximately 55 min. The formed wire inserts provided smooth threads to permit frequent assembly and disassembly operations with a minimum of thread wear. Also, corrosion caused by infiltration of water or other reactive liquids and gases will not cause deterioration of these threads.

The strength of the 18-8 stainless steel more than compensates for the loss of material in the bolt-hole boss. Also, increased loading strength is achieved because the helical insert automatically adjusts itself to mating threads on both the casting and the stud, thereby distributing the load properly over each thread.

news of industry

Ordnance Holds Key to Vast Iron Powder Growth

Shell rotating band and bullet projects would require vast quantities of iron powder . . . If adopted, program would mean multi-expansion of capacity—*By Bill Packard.*

New York—Iron powder may go to war in a big way. Domestic iron powder capacity will have to be expanded many times its present size if the Ordnance Corps adopts iron powder rotating bands for shells. A long development program is believed nearing the decision stage now. Depending on whether the war is hot or cold, and also on the outcome of iron powder bullet development work, the required expansion might be over ten times capacity now.

The idea of making rotating bands by powder metalluragy is not new. Neither are iron powder rotating bands. We made some copper bands by powder metallurgy during the last war. But the Germans went us one better. Spurred by a terrific copper shortage, they used iron powder.

German Output Zoomed

The German rotating band program was reflected in their iron powder production statistics. In 1938 they produced no more than 300 tons of iron powder. But in 1944 they hit a peak of almost 33,000 tons. They produced more than a billion rotating bands in addition to vast numbers of bullets and parts—all from iron powder. Their rotating bands ranged from 20 mm to 88 mm. Their manufacturing methods have been exploited in our own development work.

Intensive study of iron powder rotating bands has been underway at Watertown Arsenal, Stephens Institute and Purdue University during the past 2 years. A Shell Committee was formed last August to study materials, engineering and manufacture of shells. A Powder Metallurgy Committee from industry was formed to advise the Shell Committee on metallurgical problems. A total of 27 men from industry, serving on five subcommittees, are working on powder metallurgy.

Ordered for Test Firing

Specifications for revolving bands made of iron powder have been set up based on work done at Watertown Arsenal. A moderate quantity of these bands has been ordered from industry for test firing. A decision on their future should not be long in coming.

Rotating bands made by powder metallurgy are precision jobs. Both inside and outside diameters are circular and concentric. Surfaces are precisely flat and parallel. Cost is competitive with metal tubing. No machining is required.

Although there are only three domestic producers currently making iron powder, there are more than 100 plants making metal powder parts. There is no shortage of presses needed to convert the powder into parts. Also, many presses now making cores

Turn Page

Excess Profits Forms

Washington—Grief for industry went into the mails last week when the Treasury Dept. released forms for filing excess profits tax returns. All corporations covered by the Excess Profits Tax Act of 1950 must submit to the purse-sapping by completing Schedule EP-form 1120.

Exempt from the new tax are firms with excess profits net income of $25,000 or less. For the big brothers of industry the new form applies to the period: July 1, 1950, through Dec. 31, 1951.

Firms Gets U.S. Steel Contracts

Pittsburgh — Morrisville Contractors, a combination of four construction firms, has been given the contract for foundations, floors, roads, tracks, and sewers for the Morrisville, Pa., plant of U. S. Steel Corp. The contractors include Walsh Construction Co., Davenport; S. J. Groves & Sons, Inc., Minneapolis; Perini & Sons, Inc., Framingham, Mass., and Slattery Construction Co., Inc., New York.

Morrisville Plant Openhearths

Pittsburgh — Koppers Co. Inc. will engineer and construct the nine 275-ton openhearth furnaces to be built at the new Morrisville, Pa., plant of U. S. Steel Co. The Wilputt Coke Oven Div. of Allied Chemical and Dye Corp. will design and erect two coke oven batteries of 87 ovens each at the mill.

INDUSTRIAL BRIEFS

CENTURY MARK — The E. HORTON & SON CO., Windsor Locks, Conn., in the lathe chuck industry, is now in its 100th year of operation.

"NOT LEGAL" — The pending merger of the PERFECT CIRCLE CORP. and THOMPSON PRODUCTS, INC., Hagerstown, Ind., will not be completed. The Department of Justice advised that the merger would be in violation of the anti-trust law and it would institute litigation if merger were put through.

SOLE U. S. REP.—KALEX CORP., N. Y., are the exclusive distributors in the U. S. for Cary of Switzerland, makers of high precision gages.

NEW LOCATION — The plant of EMPIRE SOLVENTS, INC., has moved to Clifton, N. J. Their general offices and laboratory are located in N. Y.

UNDER CONSTRUCTION — Construction has begun on the new office and warehouse building being erected for PETER A. FRASSE & CO., INC., Syracuse, N. Y. The building will permit the consolidation of the entire Frasse Syracuse operation under one roof.

OPEN HOUSE—BEALS, McCARTHY & ROGERS, INC., marked their 125th anniversary with a 3-day open house celebration at their new office-warehouse in Buffalo. During the 125 years of existence the firm outgrew its quarters eight times.

PATENT RIGHTS—Patent and manufacturing rights for the Tromp Heavy Density Coal Cleaning System have been acquired for the Western Hemisphere by McNALLY PITTSBURGH MFG. CORP., Pittsburgh. The Tromp system is widely used in England, France and Holland for the cleaning of the low-gravity and high-gravity coals.

NEW HIGH—The net earnings of the PENNSYLVANIA SALT MFG. CO., Philadelphia, after taxes, for 1950, were the highest in the company's 100 years. These earnings were 49 pct higher than profits earned in 1949 and 118 pct more than the average annual profit for the preceding decade.

ASSN. SECRETARY — Robert T. Griebling will serve as executive secretary of the AIR POLLUTION & SMOKE PREVENTION ASSN. OF AMERICA, INC. The headquarters of the association will move from Chicago to Pittsburgh and will be housed in Mellon Institute.

SIGNAL EQUIPMENT — LEWYT CORP., Brooklyn, has been awarded a $4,500,000 contract by the U. S. Army Signal Corps., to manufacture communication equipment.

AMERICAN AGENT — Exclusive representation for the Pouplier Steel Mills, Hagen-Kabel, Germany, has been given the NEW AMSTERDAM IMPORT CO., New York. The Pouplier Mills have increased their capacity.

TENTATIVE CONTRACT — BROWN & ROOT, INC., Houston engineering and construction firm is the lowest bidder on the general contract covering erection of Lone Star Steel company's $73.5 million integrated steel mill to be built at the E. Texas works. A formal contract is awaiting approval by directors and RFC officials.

ACROSS THE RIVER—Transfer of the sales and manufacturing facilities of the S. G. FRANTZ CO., INC., from New York to Trenton, N. J., has been completed. The new plant provides ample space for sales and administrative offices, as well as a large area for manufacturing operations.

or parts could be quickly converted to revolving bands if the word is given. Production rates for these presses are very high.

But the most compelling reason for switching from copper to iron powder is the availability of material. The outlook for substantially increasing supplies of copper is bleak. But raw materials for iron powder are abundant.

Plenty of Raw Materials

While most domestic iron powder is made from mill scale, it can also be made from high grade iron ore or steel scrap. During the last war the Germans made it from chopped wire and scrap, as well as sponge iron.

Last year domestic iron powder producers shipped 4125 net tons of powder. During the same period we imported 6000 tons from Sweden. Domestic capacity is being expanded, but not by the leaps and bounds that will be necessary if Ordnance adopts iron powder widely in revolving bands and bullets. The switch is not expected to be made overnight.

NPA to Aid Diesel Engine Industry

Washington—A plan by which the National Production Authority will help the diesel engine industry obtain material for production is being worked out. However, the industry has been told to expect production in the near future to be limited to highly essential uses.

Inco of Canada Chairman Dies

New York—Robert Crooks Stanley, 74, chairman of the board and former president of International Nickel Co. of Canada, Ltd., died here this week. Mr. Stanley was noted for discovering Monel metal and held several patents on processing and refining of metals. He studied engineering at Stevens Institute of Technology and Columbia School of Mines and was a metallurgist since 1901, when he joined Oxford Copper Co. After being made a director of International in 1917, he was named president in 1922.

U.S. Shipbuilding Program Starts With Awards to 5 Yards

First of 25 ships to be delivered in 480 days . . . Cost $8 million each.

Washington — The first large scale government shipbuilding program since World War II has been set in motion with award of 25 Mariner ship contracts to five shipyards at a cost of approximately $8 million per ship.

Congress appropriated $350 million for the new ships last month and bids invited from shipyards on Jan. 10 were opened Jan. 31. Of 11 yards responding, the following were accepted: Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; Ingalls Shipbuilding Corp., Pascagoula, Miss.; Bethlehem Steel Co., Sparrows Point, Md.; Bethlehem Steel Co., Quincy, Mass.; Sun Shipbuilding & Dry Dock Corp., Chester, Pa.

At prices awarded, higher cost yards will probably receive less profit per ship than lower cost yards, the Maritime Administration reported. Contracts call for delivery of the first ship from Newport News and Bethlehem-Quincy in 480 days, with other deliveries up to 730 days.

R-108 Prolongs Life of Steel

Pittsfield — Development of R-108, an ingredient to give improved alkali and acid resistance to paints, has been announced by the Chemicals Div. of General Elec. Used on steel, the coating conserves expensive and hard-to-get alloys, GE claims. Steel drum life can be extended, and experiments are being made with R-108 to replace tin used in food containers.

B & O Ore Pier Ready in April

Baltimore—Foreign ore shipments from Liberia and Venezuela can be handled here soon after completion in April of the Baltimore & Ohio Railroad's new $5 million ore pier at Curtis Bay.

Two Dravo ore unloading machines will be able to unload a ship in 24 hours, handling from 1000 to 1500 tons an hour. First of its kind on the Eastern seaboard, the pier will be expanded to accommodate two ships simultaneously as soon as the flow of ore justifies it.

OPS Studies Formula Prices For Nonferrous Foundry Industry

Washington — Formula price-control for the nonferrous foundry industries is being studied by the Office of Price Stabilization.

Nonferrous foundry representatives last week urged OPS to permit the industry to continue using individual company formulas under any price regulation the government may issue.

OPS was told the multiplicity of foundries and wide diversity of production make formula pricing "inescapable" in the affected industries.

Foundry representatives requested the order be issued as soon as possible to remove the industry from provisions of the current general price regulation.

NMTA Urges Industry Restudy Employment Practices for Women

Job breakdown, control redesign suggested . . . Training needed.

Chicago—With the number of women in industry showing a sharp upward turn, and still the nation's biggest reservoir of untapped labor, the National Metal Trades Assn. urges manufacturers to review employment and shop practices in light of World War II experience.

Job breakdowns, redesign of operating controls and safety devices to accommodate women's smaller stature, and revision of material handling facilities will enable women to attain greater production levels.

Recruiting in the 25 to 35 year age group may be complicated by lack of child care facilities since there are relatively more women with young children than before the last war.

While many states relaxed laws governing employment of women during World War II, NMTA recommends review of state and federal laws on lifting loads, hours,

Defense Contracts to Metalworking Industry

Selected Contracts, Week of Feb. 12, 1951

Item	Quan.	Value	Company
Aircraft engines	136	$1,224,000	Capitol Airlines Nat'l Airport, Washington, D. C.
Automatic pilot comp's.	...	1,969,611	Sperry Gyroscope Co., Great Neck, N. Y.
Propeller assemblies	...	984,872	Curtis-Wright Corp., Caldwell, N. J.
Carburetor parts	...	875,378	Bendix Products Div., South Bend
Aircraft parts	...	4,271,273	North American Aviation, Los Angeles
Aircraft generators	...	1,146,014	General Electric Co., Dayton
Wheel & brake assemblies	...	1,279,000	Bendix Products Div., South Bend
Radios	2266	2,000,000	Radio Corp. of America, Camden, N. J.
Aircraft Comp's	...	14,000,000	Lockheed Aircraft Corp., Burbank, Calif.
Trucks	483	892,659	General Motors Corp., Detroit
Trucks	4500	12,380,000	Studebaker Corp., South Bend
Trucks	320	379,046	Chevrolet Motor Corp., Detroit
Carburetors	90,000	602,500	Lally's Des Moines, Iowa
Trucks	3050	8,000,000	International Harvester Co., Chicago
Trucks, gas tanks	4173	11,557,528	Reo Motors Inc., Lansing, Mich.
Trucks	595	3,090,446	Federal Motor Truck Co., Detroit
Motors	489	35,000,000	Cadillac Mtr. Car Div., Detroit
Buses	1772	7,255,954	Ford Motor Co., Washington, D. C.
Automobiles	164	229,591	Buick Motor Div., Detroit
Trucks	10,298	18,515,441	Ford Motor Co., Washington, D. C.
Trucks	5030	5,734,738	Ford Motor Co., Washington, D. C.
Trucks	536	834,713	Chevrolet Motor Div., Detroit
Mobile bakery	58	560,277	American Machine & Foundry Co.
Direction finder	46	800,000	Stewart Warner Corp., Chicago
Prototype Diesels	6	1,000,000	Continental Aviation & Eng., Detroit
Energizers	200	520,000	General Electric Co., Washington
Motor parts	29,188	478,768	ACF Brill Mtrs. Co., Philadelphia
Crane shovels	30	1,000,000	Bay City Shovel, Inc., Bay City, Mich.
Road rollers	150	600,000	Calion Iron Wks., Calion, Ohio
Parts	...	600,000	Thew Shovel, Lorain, Ohio
Construction equip	11	450,304	Pioneer Eng. Works, Inc., Minneapolis
Bomb components	20,000	4,690,410	Griffin Mfg. Co., Dallas
Sights	...	500,000	Argus, Inc., Ann Arbor, Mich.
Air compressors	125	800,000	Joy Mfg. Co., Chicago
Air compressors	175	1,000,000	Davey Compressor, Kent, Ohio

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pay, machinery and safety measures.

NMTA recommends simple attire and proper hair control to prevent accidents. Since women usually lack the mechanical background of men, NMTA suggests special training, and urges that supervisers be briefed to cope with different emotional reactions.

U. S. Scrambles for Metals ECA Gives Europe

Congressional ire grows as copper, lead, zinc, aluminum shipments under Marshall Plan reach $605 million in past 9 months . . . Favor joint defense approvals—*By Karl Rannells.*

Washington—Increasing criticism is being leveled at continued Marshall Plan buying of strategic materials from American stocks and sources, especially when domestic controls are being drawn steadily tighter.

Total purchase authorizations for four of the more critical metals is given in the Economic Cooperation Administration's year-end report as $605 million. This is for the period from April 1948 through December 1950.

While a majority in Congress view the Marshall Plan as an economic necessity, there is a growing feeling that there should be a closer screening of Marshall Plan demands. And there is increasing support for the belief held by Sen. McCarran, Sen. Wherry, R., Nebr.; Rep. Reed, R., N. Y.; Rep. Rees, R., Kans., and others, that shipments of strategic materials from this country should be approved only when necessary for joint defense.

U. S. Supplies Third of Total

But best available figures indicate that to date the totals within ECA's stated period approach nearer $625 million. Roughly broken down, this amounts to about $350 million worth of copper and copper products; $130 million worth of aluminum; $85 million in zinc and its products; and about $60 million worth of lead and its products.

Actual deliveries, of course, lag somewhat behind the purchase approvals. Nevertheless, ECA reports through November showed that paid shipments of these metals were running at about 80 pct of total authorizations. Roughly a third was being shipped from the United States.

A substantial portion of these total authorizations was approved prior to the setting up of the National Production Authority—and thus is water over the dam. However, great concern is being created because purchase approvals have slowed down but little since NPA began slapping controls and restrictions on domestic supplies, use and distribution.

As an illustration, in addition to $8 million worth of aluminum some $17 million worth of copper and its products were authorized by the ECA during the first 2 months of control—November and December. A third of the copper was to be bought in the United States and the total just about equals the current stockpiling buying rate.

"That isn't all scrap—my machine is under there somewhere."

Moreover, ECA announced in mid-January that it had authorized Germany to buy some $2 million worth of copper and copper products from the United States. A few days later it authorized a similar purchase by the Dutch which amounted to roughly $367,000.

These approvals were announced 2 and 3 weeks after NPA had issued its amendment to the original copper cutback order (M-12) which barred use of copper in manufacture of more than 300 end items. Similar restrictions have been placed on aluminum, nickel and tin.

Restrictions Run Wide Range

What is making it bad from all viewpoints is that the prohibited lists are not confined to strictly non-essential articles. They also apply to various types of tools, building materials, hardware and so on.

"It is manifestly unjust to allow the export of such materials if they are to be used in Europe for purposes which are prohibited here at home," Sen. McCarran, D., Neb., declared on the Senate floor recently.

Neither business nor labor understand why the government continues to follow two apparently conflicting policies—strict domestic conservation with one hand and distribution abroad with the other. They say it will bring production cutbacks and unemployment.

Japanese Copper to Europe

Nor do they understand why between 15,000 and 20,000 tons of Japanese copper was permitted to be sent to Europe and the Far East over a 21-month period while copper was short here.

The ECA takes the position that Marshall Plan nations need such raw materials in order to keep factories going and to keep from being a greater burden to this country.

It explains the Japanese shipments by saying this "enables the United States to use more of its own production for defense mobilization."

Woodward Expansion Adds To Coking, By-products Facilities

Raises to 154 number of new ovens announced in area in past 5 months.

Birmingham—A new $4 million expansion program has been announced by Bradford G. Colcord, president of Woodward Iron Co. Construction will start at once.

Major item is 30 additional coke ovens with a capacity of 115,000 net tons annually. It will bring to 154 the total of new coke ovens announced for the Birmingham area in the past 5 months and will increase annual coke production approximately 600,000 tons.

Others that have announced plans for new coke ovens and on which work actually has started are: Republic Steel Corp., 65 new ovens; Sloss-Sheffield Steel & Iron Co., 30, and Alabama By-Products Co., 29.

At present Woodward has 226 coke ovens producing some 850,000 tons annually.

Includes By-Products Facilities

The Woodward program also calls for additional coal and coke handling facilities for increased production of coal chemical by-products, including ammonium sulphate, coal tar, benzene, xylene, toluene, napthalene and pyridine.

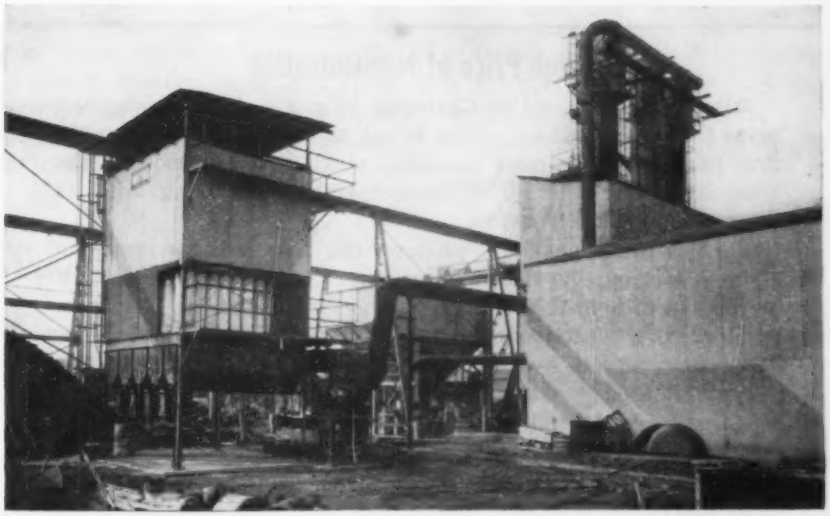
The company is constructing a new $4½ million blast furnace to produce about 237,250 gross tons of pig iron a year. Later it plans to add steam and power equipment and transportation facilities.

Income More Than Doubled

Chicago—A. M. Castle & Co., Chicago steel distributors, report a net 1950 income of $1,319,789 as compared with $539,775 for 1949. Net sales of the company for 1950 came to $18,709,876.

ASIE Honors Westinghouse

New York—Westinghouse Electric Corp. has been given the Merit Award of the American Society of Industrial Engineers for leadership in research, engineering, design and manufacture in the home laundry field.



ANTI-SMOG EQUIPMENT: General Metals Corp. iron plant at Vernon, Calif., has a new weapon against smog in Los Angeles area. It is a Whiting Corp. five section Bag Type Dust Suppressor serving two No. 4 cupolas. Shown at upper right are cupolas with conditioning chambers attached to upper stacks. All gases and remaining dust, fumes, and smoke are channelled to the dust suppressor (left) for final cleaning. The tough Los Angeles County Air Pollution Control District has approved the installation.

Pittsburgh Coal Builds Coal Pipeline for Surface Mining Site

Pittsburgh — Transportation of coal by pipeline is here.

Pittsburgh Consolidated Coal Co. is building a 3-mile coal pipeline system near Cadiz, Ohio, at the Georgetown surface mining operation of the Hanna Coal Co. Div. The project is expected to be in operation this summer.

Experiments by Pitt-Consol at a small pilot operation at Library, Pa., apparently convinced the company that pipeline movement of coal is feasible. The $550,000 demonstration-size line is expected to show up any bugs that still must be worked out.

Coal will be pumped through the 12-in. pipeline in the form of a coal-water "slurry." At the other end of the line the coal will be drained and dried. It was believed that fine coal for power plant use and perhaps stoker size coal could be transported in this manner.

After crushing, the coal will be washed and mixed with water to form a slurry. Special pumps have been designed to push this mixture through the line under pressure. The company expects to pump several thousand tons of coal per day through the line.

U.S. Okays Green River Steel Loan; Considers North American

Washington—Green River Steel Corp. last week received a government loan for $8,356,000 for construction of an electric furnace at Owensboro, Ky., and government officials this week met to consider application by North American Steel Co., of Clinton, Iowa, on request for a $100 million steel mill loan.

The two loans covering construction of the Owensboro plant will bring an additional 189,000 tons of ingot capacity annually. The plant will employ from 800 to 1000. Operations are expected to begin within a year. The corporation has an option on a 127-acre site in a coal reserve.

North American Steel Co. plans to make 1 million tons of finished steel annually, plus 400,000 tons of pig iron. To be built on the Mississippi River, south of Clinton, at Comanche, Ia., the new plant will produce sheet, bar, and slat steel.

Robinson Gets Ordnance Post

Cincinnati—Harry S. Robinson, retired general manager and treasurer of the Cincinnati Shaper Co., has been named chief of the Cincinnati Ordnance District.

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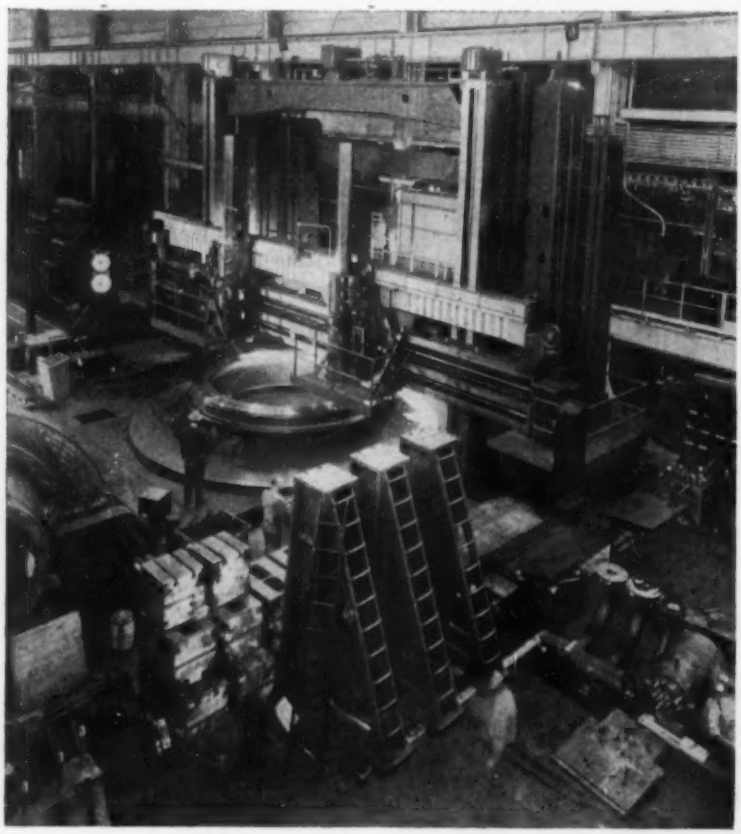
High Price of Mechanization

Milwaukee, Wis.—Allis-Chalmers Mfg. Co. has paid a high price for mechanization. This is not as dire as it sounds. The firm has bought its most expensive single machine tool for the West Allis Works—a 30 ft heavy boring and turning mill, its second largest machine tool.

A Lima-Hamilton Corp. product, the new mill can machine single pieces up to 30 ft, 5 in. diam and 17 ft high. Supplementing production of a 40-ft boring mill, largest in the shops, the 30-in. mill increases capacity for manufacture of large generators, condensers, steam and hydraulic turbines.

It weighs about 500 tons and is 48 ft tall, 37 ft of which is over the floor line, and is 59 ft wide, with a depth of 29 ft. The mill has an elevating type crossrail on which are mounted two swivelling rail heads with 14-in. octagonal boring bars about 18 ft in length.

Push button control from four stations operate 36 motors. Shown in the photograph on the mill's table is a bottom guide vane for a hydraulic turbine.



Koppers Co. Reports Earnings

Pittsburgh—Koppers Co., Inc., reports net income of $11,615,498 during 1950 compared with $7,111,997 in 1949. Sales and receipts in 1950 were $213,791,687 compared with $192,314,685 in 1949.

Study U.S. Coal Mining Methods

London — A 16-man English team will study the American coal mining industry from top to bottom in a program sponsored by the ECA. The group, which sailed for the U. S. last week, will visit a dozen bituminous coal fields.

More Non-Defense Steel Cuts To Hit Industry Apr. 1, NPA Says

Further cuts in aluminum and copper planned . . . Blow to auto production

Washington — Further limitations on non-defense use of steel were in the final draft stage this week. The new order will cut back steel use for durable goods on an industry-by-industry basis.

It is scheduled to become effective Apr. 1. A National Production Authority official said the method was selected as a preferable alternative to imposing end-use restricting as in the case of aluminum and copper. NPA feels manufacturing industries are in best position to determine where steel allotments can be used to best advantage.

No Cut for Auto Parts

Further limitations on aluminum and copper uses were also being completed. The three orders will hit the automotive industry hard. Some estimates are production will have to be cut back 50 pct instead of the expected 25-30 pct.

However, officials said it is not planned at present to apply the steel cut-back to the automotive parts industry. They indicated production would probably be allowed at 100 pct of the average rate during first half 1950.

Steel Firms Move Mountains And Reroute Rivers for Expansion

New York—Steel companies will move mountains of ore, reroute rivers, move cemeteries in their concerted push for vast steel expansion.

A river will be set on another course so that one steel firm can get room for a new mill building. Another company will gingerly move the contents of two cemeteries for expansion land. This involves shifting 250 graves and headstones, reported the American Iron and Steel Institute.

One firm plans to insert a large section in the middle of one of its

ore vessels so the ship can haul more ore. Houses were moved wholesale by two firms. One of them moved 100.

Now under construction is a 360-mile railroad to connect Labrador-Quebec ore fields. Other big construction projects are going on in foreign lands to provide ore for steel capacity that will be over 120 million tons by the end of 1952.

Dual Tin Coat May Alter Production, Pricing

Right now it means tin savings . . . May cause revision of tin cut order . . . Weirton offers tinplate now . . . Its Halogen process readily adaptible to dual coatings—*By John Delaney.*

Pittsburgh—The dual coatings electrolytic tinplate process developed by Weirton Steel Co. could have important effects on the producing methods and pricing policies of the industry.

Of more immediate importance, the process will help conserve tin. Weirton estimates that tin metal savings will be between 25 and 30 pct. The company's announcement stated also that the process may enable the government to revise recently-announced restrictions on tin consumption and end uses of tin mill products. Weirton already is offering the new tinplate to its customers.

Unequal Tin Coatings

The dual coatings process means that a coating of sufficient weight to protect the contents of a can may be deposited on one side of the plate, with just enough for appearance and protection against corrosion on the other. Before the Weirton development, the industry-wide practice was to apply the same coating weight on both sides.

The Halogen process, used by Weirton, electrolytically coats each side of the plate individually, and is readily adaptable to dual coating. This same type line is operated by Republic Steel Corp. and is being currently installed by Jones & Laughlin Steel Corp. at its Aliquippa plant. However, all other lines in the industry coat both sides simultaneously. Whether they can be adapted economically to dual coating is a problem now under study.

Since the new process requires less tin, electrolytic tinplate prices could eventually be revised to reflect this saving, although this is not an immediate probability in view of recent advances in the price of pig tin.

Revise Basis Box Weights

One immediate effect was the revision by Weirton of six standard basis box weights of tinplate, revealing that the company now is producing 1.00 lb electrolytic as a substitute for 1.25 lb hot dip, in itself a tin conservation measure which most consumers of 1.25 and 1.50 lb hot dip had anticipated. (THE IRON AGE, Jan. 11, '51, p. 77.)

For example, the former 1.25 lb basis weight hot dip is now produced by Weirton with 1.00 lb for the interior of the can and 0.25 lb for the exterior—a saving of 50 pct in tin. It also means an increase of 100 pct in surface coverage with the same quantity of tin.

In the former 0.50 lb basis weight the saving on tin is 25 pct and the increase in area covered is 33.3 pct. The former 0.75 lb basis weight shows a saving of 33.3 pct with an increase in area of 50 pct.

"Yoo Hoo, Boss—I'm back from the lavatory—."

Exports Mean Hardship

Some mills believe that Government restrictions on end use are not sufficient to balance the reduction in the amount of tin they are permitted to consume. Any export allocation orders that may be given the industry could impose a real hardship on both producers and consumers.

Worrying some producers is the effect government restrictions will have on electrolytic operations. Their problem revolves around the necessity of satisfying hot dip requirements for perishable packs at home and abroad. Electrolytic operations will suffer in proportion to the amount of hot dip required. This would penalize electrolytic operations, and make it more difficult to hold trained electrolytic line workers.

Production of black plate is expected to be increased at the expense of electrolytic because coffee, oil and shortening have already been put on black plate.

The industry also expects that some producers will be asked to make chemically or electro-chemically treated black plate for ends of processed food cans. This will mean either the installation of new equipment or the conversion of some electrolytic lines.

USAF Div. to Open Bottlenecks

Dayton, Ohio—To open the bottlenecks for firms working on Air Force Contracts, USAF will expand its Industrial Planning Div. and give it the new name of Production Resources Div., more in keeping with its added duties. Industrial planning work will continue by a separate group under the new division.

The new agency will attempt to aid manufacturers fill manpower needs and locate scarce metals and materials to complete Air Force contracts. Headquarters will be at the Wright-Patterson Air Force Base here.

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CONTROLS *digest*

For more details see "You and Government Controls," The Iron Age, Jan. 4, 1951, p. 365. For full text of NPA regulations write U. S. Dept. of Commerce, Division of Printing Service, Room 6225 Commerce Bldg., Washington 25, D. C.

Subject	Order	Effective Date
General		
Inventory Control	NPA Reg. 1	Sept. 18
	Interpretation 1, 2, 3	Nov. 10
Priorities System	NPA Reg. 2	Oct. 3
DO Rating	Amend. 1	Oct. 3
DO Rating	Amend. 2	Dec. 29
DO Ratings	Delegation 1, 2, 3, 4	Nov. 1, 2, 3
Priorities (Canada)	NPA Reg. 3	Nov. 8
Hoarding	NPA Notice 1	Dec. 27
Auto Prices, Wages	ESA Reg. 1	Dec. 18
Ceiling Price Regulation	CPR 1	Jan. 26
Military supplies	Supplement 1	Feb. 1
Wage Increases	CPR 2	Feb. 9
Coal Prices	CPR 3	Feb. 1
Metals		
Aluminum distribution	NPA M 5	Oct. 27
Aluminum cutback	NPA M 7 (amended)	Feb 1
	Direction 1	Nov. 28
	Direction 2	Dec. 16
	Direction 3	Dec. 27
Aluminum scrap	NPA M 22	Mar. 1
Cadmium	NPA M 19	Jan. 1
Cobalt stocks	NPA M 10 (amended)	Dec. 30
Collapsible tubes	NPA M 27	Jan. 27
Columbium steels	NPA M 3	Oct. 19
Copper distribution	NPA M 11	Nov. 29
Copper use	NPA M 12 (amended)	Dec. 30
Copper readjustment	M-12 Direction 1	Feb. 1
Copper scrap	NPA M 16 (amended)	Jan. 1
Molybdenum cutback	NPA M 33 (amended)	Feb. 2
Nickel cutback	NPA M 14 (amended)	Feb. 1
Ores, metals	NPA Del. 5	Dec. 18
Steel	NPA M 1 (amended)	Jan. 22
Freight car program	Supl. 1	Oct. 26
Great Lakes ships	Supl. 2	Nov. 15
Canadian freight cars	Supl. 3	Dec. 15
Steel scrap	NPA M 20 (amended)	Jan. 29
Steel warehouses	NPA M 6 (amended)	Nov. 15
Tin inventories	NPA M 8	Jan. 9
Tinplate, terneplate	NPA M 24	Jan. 27
Metal cans	NPA M 25	Jan. 27
Tinplate closures	NPA M 27	Jan. 27
Tungsten	NPA M 30	Jan. 22
Zinc distribution	NPA M 9	Nov. 16
Zinc cutback	NPA M 15	Jan. 15
Miscellaneous		
Chemicals	NPA M 32	Jan. 23
Construction	NPA M 4	Oct. 27
	Amend. 1	Oct. 13
	Amend. 2	Nov. 15
Elec. components	NPA M 17	Oct. 18
Iron, Steel Scrap Prices	OPS	Feb. 7

Industry Controls This Week:

NPA Orders

M-14, Nickel use, as amended—Makers of Nickel alloy may not extend priority ratings to replace nickel used before Jan 1 stainless steel and high nickel content materials. Effective Feb. 1.

Seek Electronics Priorities

Washington—The Assn. of Electronic Parts and Equipment Mfrs. will present to NPA a resolution to obtain critical materials for fabrication of maintenance, repair and operating supplies for their industry, reports Kenneth C. Prince, mobilization committee. The plan will suggest a priority system.

Add 2396 Locomotives in 1950

Washington—Class I railroads put 2396 new locomotives in service during 1950, more than in any other year in the past 27 years, according to the Assn. of American Railroads. Of these, 2372 were diesel, 12 steam and 12 electric. New locomotives in 1949 totaled 1865, of which 1808 were diesels.

L&N Orders 5200 Freight Cars

Birmingham—The largest single order ever given the Pullman-Standard Car Mfg. Co. here, 5200 freight cars, was placed by Louisville & Nashville Railroad. The order is worth $27.5 million.

Ben Fairless Wants Termite Control Against Red Saboteurs

New York—Benjamin Fairless, president of U. S. Steel Corp., warned against the invisible Red army of trained termites who could bore from within to undermine American productive capacity—most feared by Moscow. He spoke at rites awarding him the Sales Executives Club Applause Award for outstanding salesmanship and public service at the Roosevelt Hotel here last week.

Armco's Hook Also Speaks

Also on the speaker's rostrum, Charles R. Hook, Armco Steel Corp. president, spoke against government financing of mills proposed by "certain groups who wanted to get into the steel business on a shoestring." He said that he was not eager to "run a race with a competitor who has little to lose because he is being financed by the American taxpayer."

Tactics of the trained termites, said Mr. Fairless, will be to attack management through the labor press and create strikes. They will also strive to play economic group against economic group and plot against public confidence in big business, he continued. Mr. Fairless advocated "Termite Control" by teamwork, knowledge of each other's problems by industry and government, and passing information to the public.

Plan Steel Mill in Virginia

Washington—Present fast tax writeoff provisions may give a real push to the regional steel mill for a local market. Another plan that may fit the pattern was disclosed here with Tidewater Industries, Inc., application for a certificate of necessity. The mill would be located in the James River basin, east of Richmond, Va.

Tidewater obtained a charter from the Virginia State Corp. Commission and it is said that the mill would use ore from South America and southwest Virginia coal and limestone.

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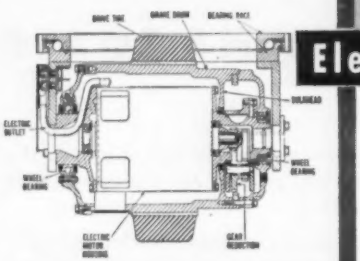

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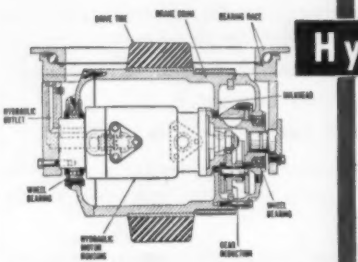

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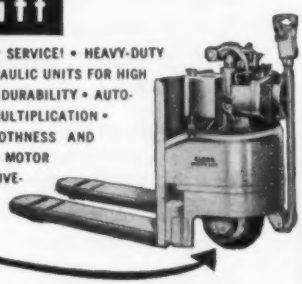

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PA's Report Delivery Slowup, Price Hikes on Supplies Received

Chicago—The January report of the business survey committee of the Purchasing Agents Assn. of Chicago reveals that 70 pct of members reported suppliers' deliveries are slowing down and 76 pct reported paying higher prices for the suppies received.

Order backlogs continued for 60 pct reporting while buying policies of over 75 pct have extended beyond 90 days.

A large majority of those queried believe a realistic priorities allocation of materials should be instituted immediately. Three out of four of the reporting members feel present voluntary steel allocation allotments are not equitable.

Aluminum Assn. Elects Officers

New York—A. P. Cochran, of Cochran Foil Co., Inc., Louisville, Ky., has been elected president of the Aluminum Assn. A. V. Davis, of Alcoa, was re-elected chairman, and Donald M. White was reappointed secretary and treasurer. Vice-presidents are: I. T. Bennett, Revere Copper & Brass, Inc.; L. M. Brile, Fairmont Aluminum Co.; E. G. Fahlman, Permold Co.

Firm to Build at Olean, N. Y.

Milwaukee—Plans for erection of a plant at Olean, N. Y., to make protective power line equipment have been announced by Line Material Co. The 70,000 sq ft plant, on a 24 acre tract east of Olean, is expected to be in production by next fall. The local plant will be given over to munitions production.

NE Contracts Over $222 Million

Boston — Defense contract awards amounting to more than $222 million have been awarded in the New England area, according to the New England Council. The 6-state region is contributing 6 pct of national defense production compared with 9 pct during the peak of World War II.

OPS Steel Warehouse Order In Works; Would Affect Importers

Washington—Price adjustments for steel warehousers and importers are being considered by government price stabilizers.

The Office of Price Stabilization is drafting a new pricing regulation for the steel warehouse business that would put prices on a formula basis.

W. F. Sterling, metals price consultant, is studying means of affording relief to steel importers. The trade complains prices have been frozen at lower levels than those of competitors who recently entered the importing business. This makes it increasingly difficult for old firms to obtain foreign steel.

Information Service Set Up

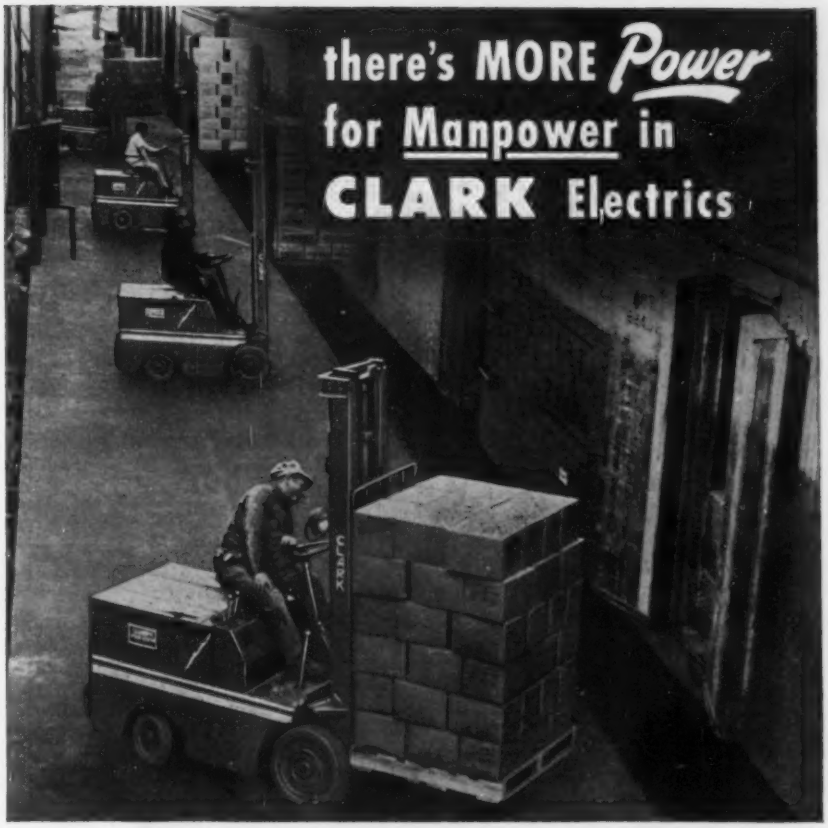
Washington—The Office of Publication Information of the Defense Dept. has established an Industrial Services Branch for spreading information of interest to industry. The branch will combine functions of the Industrial Services Div. of the War Dept. and the Industrial Incentive Div. of Navy Dept. of World War II.

Introduce New Tungsten Electrode

Fitchburg, Mass.—New Hi-Thoria tungsten electrodes, producing a stable arc over a wider range of currents and resisting contamination by weld metal, have been announced by General Electric's Welding Divs. here The firm claims major applications will be for inert arc welding with direct current, straight polarity with either argon or helium gas. The electrodes reportedly reduce costs.

Solar Aids Sub-Contractors

New York—Solar Steel Corp. has opened a Washington information office to help small business get information on sub-contracts, contract specifications, and government procurement procedures. The free service is directed by Nathan Siegal, 219 Woodward Bldg.



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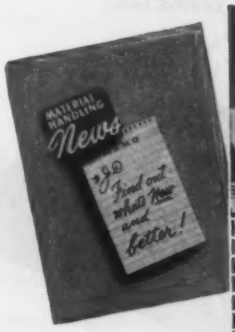
√ faster speeds √ easy steering √ hydraulic brakes

BE SURE TO SEE THE CLARK EXHIBITS AT THE 47TH NATIONAL MATERIALS HANDLING EXPOSITION INTERNATIONAL AMPHITHEATRE CHICAGO APRIL 30-MAY 4 1951

As a step toward more power for your manpower, get well acquainted with Clark Electrics, Clark gas-powered machines and the whole Clark Leadership Line of materials handling equipment. Send the coupon and get facts of fundamental value.



CLARK ELECTRIC AND GAS POWERED FORK TRUCKS
AND POWERED HAND TRUCKS • INDUSTRIAL TOWING TRACTORS

INDUSTRIAL TRUCK DIVISION • CLARK EQUIPMENT COMPANY • BATTLE CREEK 51, MICHIGAN
Please send: ☐ Material Handling News ☐ Condensed Catalog ☐ Movie Digest
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AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN PRINCIPAL LOCATIONS

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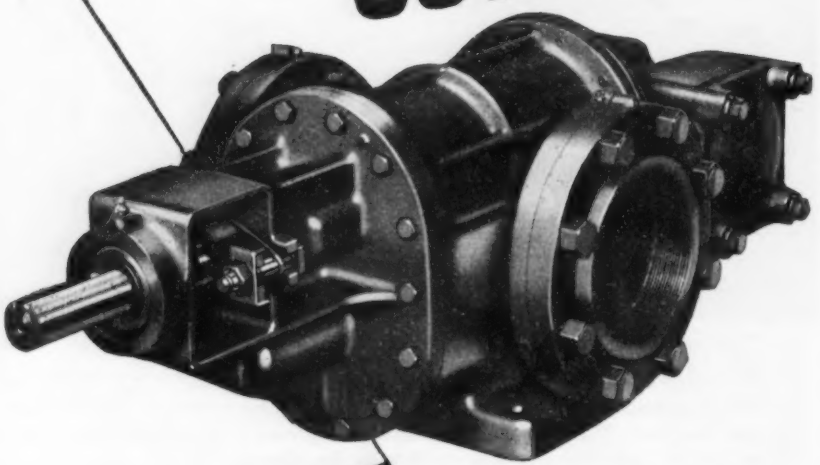
NEW...
300 G. P. M.
COMPACT



ROPER
3600 HBRV No. 7 PUMP

For
Petroleum, Process
and General
Industries

This new model Roper pump is extremely compact for its rated capacity of 300 G.P.M. It features the highly efficient venturi suction and discharge principle for smooth flow; deep packing box with lantern ring to permit effective sealing and long packing life. All components are carefully machined, inspected, and tested to assure dependable performance under prolonged runs. The case can be fitted for steam heated operation at small extra cost . . . ideal for pumping thick viscous liquids. It can be driven by gasoline engine, geared head motor or truck power take-off for a wide range of applications. Find out now how this Roper 3600 fits into your pumping requirements.

Send for Descriptive Literature

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ROPER
Rotary Pumps

Armour Foundation Scientists Can Now X-Ray Steel 8 in. Thick

Chicago—Scientists at Armour Research Foundation of Illinois Institute of Technology can now take X-ray pictures through solid steel 8 in. thick

A radioactive source shielded by 16 to 30 in. of concrete emits 65 billion gamma rays per second and has a penetration power similar to 1.8 grams of radium. With this source, hidden flaws in metal castings, welds, and soldered joints can be detected and crystals sensitive to radiation can be studied, according to Dr. Richard C. Humphreys, assistant chairman of the Foundation's physics department.

Technically termed cobalt 60, the radiation source enables physicists to make shadowgrams of subject material on photograph film placed between two sheets of lead. The exposures frequently require up to 48 hr.

English Boost Coal 58¢ a Ton

London—The National Coal Board has approved a boost in coal prices, as of Feb. 5, to compensate for government pay raises to miners aimed at increasing production.

The increase, 58¢ a long ton at the mine, will add $19,600,000 to the steel industry's annual fuel bill, or more than $1 a ton on finished steel. Whether or not the industry will absorb the increase has not been decided. Present fuel supplies are low and a long winter would result in large-scale shutdowns.

Ships Package Power Plant

Sunnyvale, Calif.—The largest and heaviest assembly of electrical apparatus, a 157,000-lb power plant, was shipped from Westinghouse Electric Corp.'s plant, here to Thomasville, Ga. To add 5000 kw to that city's power supply, the unit was delivered as a packaged unit on a special low-bed railroad car. It included a steam condenser, steam turbine, and electric generator.

These new free booklets can help you CUT CORROSION COSTS IN YOUR PLANT!

To prevent rust and other corrosion of metal—to prevent deterioration of concrete and masonry—Koppers manufactures six Bitumastic® Protective Coatings; each one of these coatings is specially formulated to control specific kinds of corrosion. Now, in one compact package, Koppers offers booklets that describe all of these coatings, and show how they can solve your plant's corrosion problems. A "Visual Index" is included, too, making it easy to find the information you want.

The factual data in these booklets will be valuable in helping you to cut plant maintenance costs. Send for a set of booklets today. Just fill out and mail the handy coupon.

HERE'S WHY KOPPERS BITUMASTIC COATINGS GIVE LASTING PROTECTION AGAINST CORROSION AND DETERIORATION:

- **Koppers Coatings, unlike maintenance paints, are specially formulated from a tar-pitch base* that is for all practical purposes impervious to water.**
- **Koppers Coatings provide a tough, impenetrable barrier to corrosive elements.**
- **Koppers Coatings provide up to 8 times the film thickness of conventional paint coatings.**
- **Koppers Coatings stop corrosion caused by moisture . . . acid fumes . . . alkaline fumes . . . corrosive soil . . . salt air . . . heat.**

**Hi-Heat Gray contains heat-resistant metallic base*

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Please send me without charge or obligation your booklets on corrosion prevention.

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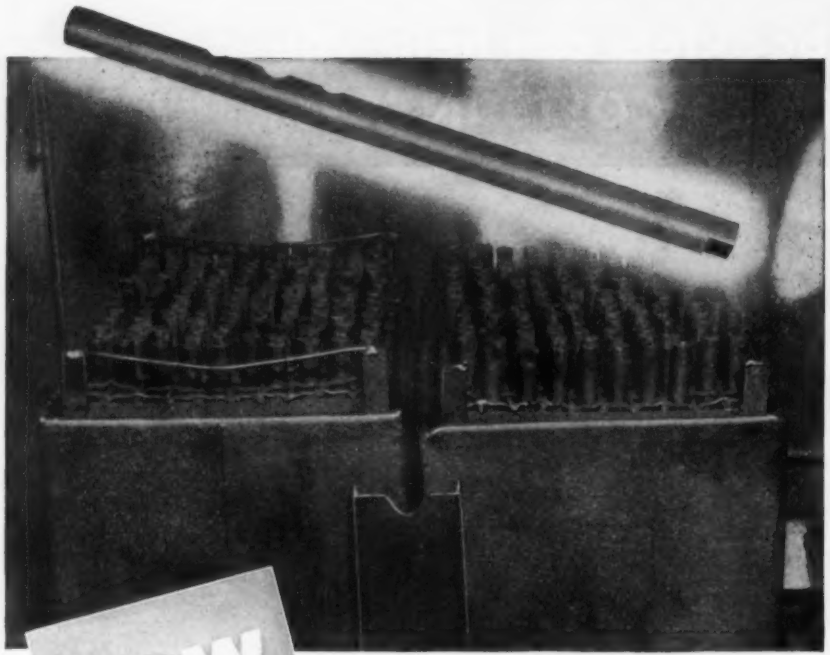
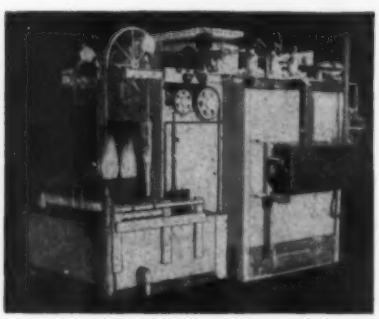


DOW sets another new record of efficiency and cost reduction

CASE HISTORY OF DOW HEAT TREATING PERFORMANCE ON SHIFTER SHAFTS AT TRACTOR PLANT

Heat Treatment: .005"-.008" effective case, carbonitrided 1500°F, Oil Quench, File Hard
Load: 640 Shifter Shafts, Fixture loaded, 1024 lbs. net — 1384 lbs. gross
Heating Time: 70 minutes Total Furnace Time: 2 hours 10 minutes
Net Production: 472 lbs. per hour



By processing these parts in the Dow Furnace, distortion is reduced sufficiently to permit elimination of the grinding operation after heat treating. Since no case is removed by grinding, the specified depth of case is reduced, effecting still further savings in heat treating costs. Reductions in direct labor, material handling, machining and cleaning costs, coupled with improved quality, contribute to savings which can amortize the original cost of your Dow Furnace in a few months.

DOW FURNACE OFFERS

- Gas cyaniding for ⅓ to ¼ the cost of liquid cyaniding
- Uniformity of light case depths throughout load
- Unmatched versatility — gas cyaniding, gas carburizing, clean hardening or carbon restoration
- Improved quality. Forced, uniform quenching gives full hardness, reduced distortion.
- Maximum capacity with minimum investment and floor space

FIRST
WITH MECHANIZED BATCH-TYPE
CONTROLLED ATMOSPHERE FURNACES

THE DOW FURNACE COMPANY

Maccabees Bldg. • Detroit 2, Michigan
TEmple 1-3553

Joint Oil Products Terminal In Birmingham to Cover 61 Acres

Birmingham—Construction has begun on a million-dollar oil products terminal to be jointly owned and operated by Pan American, Pure Oil and Gulf Refining Companies.

The terminal, with storage tanks, pipelines, pumping stations and railroad sidings, will cover more than 61 acres.

Rives Construction Company, Birmingham, has the general contract. The storage tanks will be built by the Chicago Bridge & Iron Company and the railroad sidings by the Louisville & Nashville R.R.

Osborn to Modernize Plants

Cleveland—A program to cut smoke output at the Osborn Mfg. Co.'s plant in Cleveland and modernize its Henderson, Ky., plant has been announced. New equipment at Cleveland will include a coal and ash handling system, storage silo, and railroad coal unloading equipment.

A new 200 hp boiler will be installed at the Kentucky plant. Osborn, makers of industrial brushes and foundry molding machines, will spend $500,000.

Austria Blooming Mill Order

Pittsburgh—Lewis Foundry & Machine Div. of Blaw-Knox Co. has received an Austrian order for a two-high reversing blooming mill for installation at the Donawitz Steel Works of the Alpine Montan Co., largest steel producer in that country. The order amounts to more than $1 million and is the second received by Lewis from Austria for rolling mills and machinery through ECA.

U.S. Pays English Mill Fees

London—American engineering firms building a billet mill, slabbing mill, and blast furnace at Consett Iron Co., Ltd., County Durham, will be paid $583,000 from Marshall Plan funds, the Economic Cooperation Administration has announced.

38 factory-trained fieldmen in constant circulation

THE BEST ten SOURCES FOR MECHANICAL SPRINGS

10

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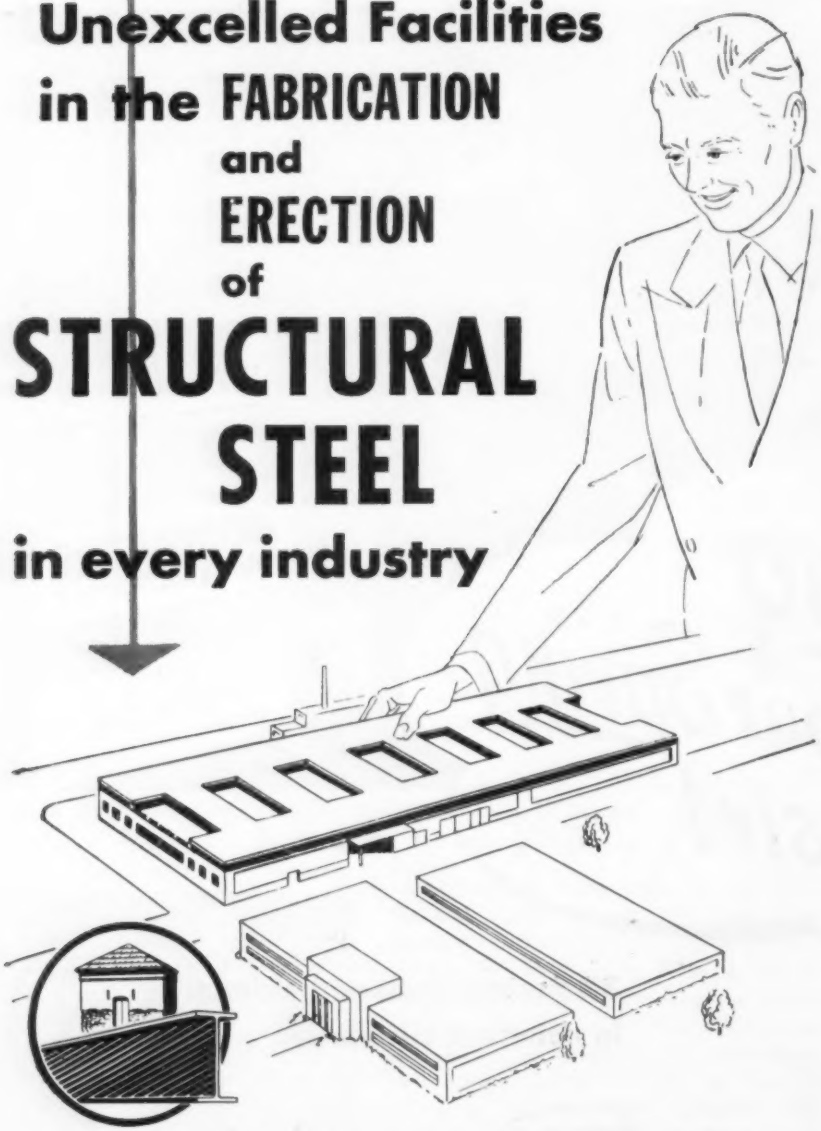
Practical Experience
PLUS
Unexcelled Facilities
in the FABRICATION
and
ERECTION
of
STRUCTURAL STEEL
in every industry



Steel plants, furniture plants, assembly plants, power plants, institutions, office buildings, bridges, wherever structural steel is used for new construction or additions to existing facilities —the Fort Pitt Bridge organization stands ready to assume the responsibility for fabrication and erection—backed by years of skill and experience and an outstanding reputation for dependability.

"Steel Permits Streamlining Construction with Safety, Endurance and Economy."

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STEEL CONSTRUCTION NEWS

Fabricated steel awards this week included the following:

132 Tons, Rapides Parish, Louisiana, highway bridge for Louisiana Highway Department, Forcum & James Company, contractors, to Virginia Bridge Company, Birmingham.

100 Tons, Coffee County, Alabama, highway bridge, for Alabama Highway Department, E. W. Norrell, contractor, to Virginia Bridge Co., Birmingham.

Reinforcing bar awards this week included the following:

1300 Tons, Chicago, Veterans Administration office and clinic building 11., to Joseph T. Ryerson and Son.

1000 Tons, Duluth, Oliver Iron Mining Co., to U. S. Steel Supply Co.

970 Tons, Chicago, Wacker Drive, Madison to Washington Sts., to Joseph T. Ryerson and Son.

900 Tons, Mobile, Ala., grain elevator, Jacks Construction Co., to Ceco Steel Products Co., Birmingham.

600 Tons, Columbus, Ga., housing project, Columbus Housing Authority, to Ceco Steel Products Co., Birmingham.

500 Tons, Chicago, Kostner Ave. sewer contract 3A, to U. S. Steel Supply Co.

500 Tons, Louisville, school, to Truscon Steel Co.

310 Tons, Chicago, Catholic Order of Foresters building, to Joseph T. Ryerson and Son.

300 Tons, Peoria, Ill., apartment building, to Olney J. Dean Co.

250 Tons, Milwaukee, Cutler Hammer Co., to Joseph T. Ryerson and Son.

238 Tons, Huntsville, Ala., Redstone Arsenal buildings, Butler & Cobbs Co., contractors, to Truscon Steel Co., Birmingham.

190 Tons, Blue Island, Ill., Illinois Bell Telephone Co., to U. S. Steel Supply Co.

Reinforcing bar inquiries this week included the following:

7700 Tons, Chicago, 87th and Dorchester Sts. housing project.

1400 Tons, Peoria, Ill., U. S. Engineers.

1000 Tons, Lakewood, Ohio, Edgewater Drive apts.

405 Tons, Brockenridge, Pa., Allegheny Ludlum Steel Corp.

250 Tons, Keokuk, Iowa, senior high school.

165 Tons, Franklin, Wis., administration and dormitory building.

135 Tons, Milwaukee, Chain Belt Co.

125 Tons, Akron, Ohio, Goodyear Rubber Co., Plant 2.

NPA Raises Mill DO Limits

Washington — Steel mills got official word from National Production Authority's general counsel, Manley Fleischman, that the following DO limits are revised upward within the prescribed lead time, effective immediately:

Mechanical tubing, 15 pct; alloy mech. tubing, 60 pct; sheet bar carbon, 5 pct; sheet bar alloy, 5 pct; wire rods, 15 pct; cold-finished bars, carbon, 25 pct; alloy bars, 40 pct; drawn wire, 10 pct; rough forgings, carbon, 30 pct; rough forgings, alloy, 30 pct; blooms, billets, slabs, carbon, 10 pct total. (Was 5 pct on each and is a reduction.)

Alloy blooms, billets, slabs, 45 pct total; tube rounds, carbon, 15 pct; alloy tube rounds, 60 pct; hot-rolled bars, 15 pct; hot-rolled bars, projectile and shell quality, 35 pct of tonnage represented by above, 15 pct; alloy bars, 45 pct; projectile and shell quality alloy bars, 35 pct of tonnage represented by the above, 45 pct; reinforcing bars, 20 pct; hot-rolled sheets, 17 pct; cold-rolled sheets, 15 pct; galvanized sheets, 10 pct; hot-rolled strip, 12 pct; cold-rolled strip, 12 pct; sheets, all other coated, 10 pct; and effective with May, carbon and alloy plates, 20 pct.

The "Heat" is on

AT WISCONSIN STEEL

A hundred tons of molten steel . . . yet it's only part of the day's work at our mill as we tap heat after heat of quality steel.

We are straining our plant capacity to the utmost. The "heat" is on us and the entire industry to provide enough steel to meet the increasing demands of our changing economy.

At Wisconsin, we are not compromising rigid standards of quality. We are not making delivery promises we are unable to keep. Our policy is, and always has been, to produce and deliver as we promise. We are putting the "heat" on production to the limit of our ability. We feel sure that our customers will understand when we cannot supply their full requirements.

INTERNATIONAL HARVESTER

WISCONSIN STEEL COMPANY, affiliate of INTERNATIONAL HARVESTER COMPANY
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WISCONSIN STEEL

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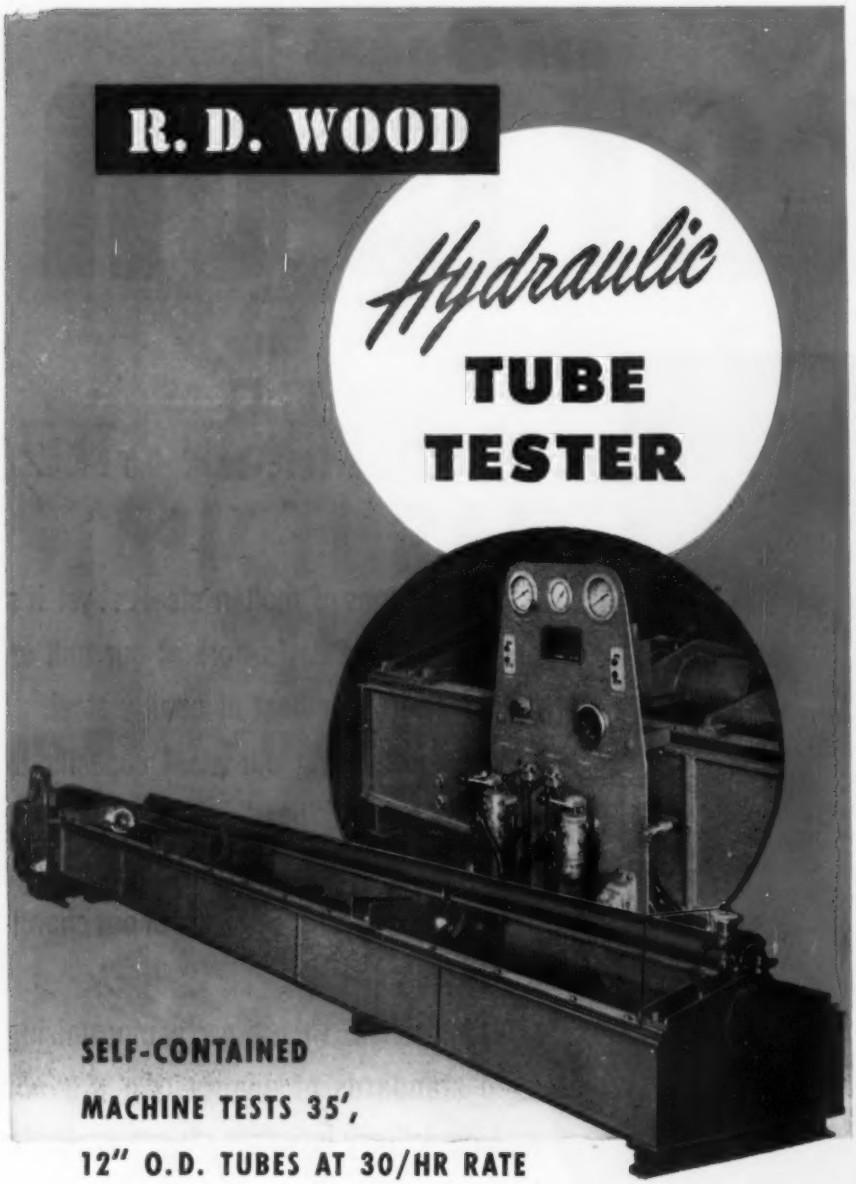

HYDROSTATIC testing of tubes is fast and easy on this completely self-contained machine. It handles tubes 4½" to 12" of maximum 35' length at preset test pressures of 700 to 1500 pounds, sealed on the ends, outside or inside diameters as desired. Maximum diameter and length tubes are tested at an average rate of one every 2 minutes, but smaller size or shorter length tubes give proportionately larger production.

The entire cycle of automatic tube admission, centering, clamping, testing, draining and ejection is single-operator worked from one control panel. Write today for complete information.

HYDRAULIC PRESSES AND VALVES FOR [illegible] • ACCUMULATORS • ALLEVIATORS • INTENSIFIERS

EST. 1803 R.D. Wood Company PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

publications

Continued from Page 36

netic controllers for mill auxiliaries are discussed in the second section. These controllers use the newly-developed type M contactor, which is available in NEMA ratings from 25 to 2500 amp. The different controllers in the line are listed, with a typical circuit diagram presented and explained. Operation of the type AP plugging relays is detailed. Standard accessories for the controllers are also described. *Westinghouse Electric Corp.*

For free copy insert No. 8 on postcard, p. 87.

For Separating, Lifting

The line of Rapid magnetic separating and lifting equipment, claiming high functional efficiency and long life with negligible maintenance, is described in a new 8-p. bulletin. Various sizes and models of laboratory and production units are shown, along with several types of lifting magnets and electromagnetic chute separators made by this British company. A representative list of materials which have been treated by the magnetic equipment described is included. *Rapid Magnetic Machines Ltd.*

For free copy insert No. 9 on postcard, p. 87.

Fine Small Tubing

Information on the analyses available, production limits, commercial tolerances, temper designations and product descriptions of seamless and Weldrawn tubing, available in sizes from 0.010 to 1⅜ in. OD, is presented in a new 4-p. bulletin. Items described in the folder include mechanical tubing, shaped tubing, aircraft tubing, instrument tubing, and tubing for electronic products. Information on ordering and a list of distributors are shown. *Superior Tube Co.*

For free copy insert No. 10 on postcard, p. 87.

Instrument Uses Reviewed

The acceleration of research through the use of industrial and related instruments and apparatus is the subject of a new 84-p. book describing many types of equipment, which, alone or in combination with other apparatus, are being used in research and analytical studies. The book details the

*CrysCoat

is in Good Company!

*Prepares Metal Surfaces for Painting

**Patented Material and Process*

"MEALMASTER", (Knox Stove Co.) the new, revolutionary combination Coal-Electric, Oil-Electric range that cooks, bakes and heats with either fuel is one of Americas' finest ranges. Beautifully designed, sturdily constructed . . . "Mealmaster" is built to give dependable long-life service. And quality manufacture is carried on through to the durable finish. Here all painted surfaces are first CrysCoated for long-lasting paint adherence and protection against the spread of rust in case of accidental damage to the finish.

The Oakite *CrysCoat* Process may be just what you're looking for. With minimum equipment . . . in minimum time . . . at minimum cost you can (1) clean metal surfaces and condition them for painting; (2) improve the adhesion of paint to metal; (3) prevent corrosion before metal is painted; (4) localize corrosion under paint if finish is broken.

The Oakite *CrysCoat* Process Offers These Extras:

1. **Eliminates operations . . . uses less equipment**
2. **Cuts operating time**
3. **Uses less chemicals for cleaning and conditioning**
4. **Reduces heating costs**
5. **Saves cost of expensive acid-proof tanks and equipment**
6. **Saves cost of frequent descaling and desludging**
7. **Drag-out costs are less because of low original cost of solution**
8. **Saves paint**
9. **Cuts cost of rejects caused by rusting before painting**

FREE . . . illustrated folder describes the Oakite *CrysCoat* Process for use in before-paint-treatment of steel, aluminum sheet and castings, zinc die castings and galvanized surfaces. If you are engaged in the fabrication of civilian goods or the speedy production of defense orders—send for Folder F7642.

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SPECIALIZED INDUSTRIAL CLEANING

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TRADE MARK REG. U. S. PAT. OFF.

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For low-cost electrocleaning use Wyandotte F.S.

Wyandotte F. S.* is designed for heavy-duty electrocleaning. It is a reverse current electrocleaner of well-balanced formula, gets work chemically clean. Important, too, Wyandotte F. S. has long life in solution and contains ingredients for water conditioning and improved rinsing.

While F. S. is used primarily for the cleaning of ferrous parts, it is satisfactory for heavy-duty electrocleaning of copper, bronze and magnesium. We suggest you write us, at Wyandotte, for the Technical Information sheet on F. S.

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Owning its basic raw materials places Wyandotte in an especially advantageous position to maintain quality—supply large quantity needs consistently.

PERFORMANCE CHARACTERISTICS

Wyandotte F. S.

- Exceptional detergency for removal of fabricating oils and smut
- Excellent smut removal
- High conductivity for maximum gas scrubbing action
- Fast and complete wetting action
- Controlled foaming
- Proper conditioning of hard water
- Very free rinsing
- High soil suspension ability
- 100% solubility in water
- Outstanding solution life
- Controlled uniform quality

THE WYANDOTTE LINE — products for burnishing and burring, vat, electro, steam gun, washing machine and emulsion cleaning, paint stripping, acid pickling, related surface treatments and spray booth compounds. An all-purpose floor absorbent: Zorball. In fact, specialized products for every cleaning need.

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publications

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robotized polarograph, titrator and still applications, and describes various types of spectrometers and continuous gas analyzers. The section on precision laboratory measuring instruments includes mention of electronic indicators, the Electrometer, pyrometers for measuring low temperatures and radiation pyrometers for measuring temperatures up to 7000°F. This section also includes information on high vacuum gages, and pressure and force transducers. A third section reviews research apparatus components such as converters, balancing motors and servo amplifiers which constitute integral operating parts of research and analytical apparatus. *Brown Instruments Div., Minneapolis-Honeywell Regulator Co.*

For free copy insert No. 11 on postcard, p. 37.

Stud Driver Bulletin

A new 4-p. bulletin on Aero-Thread stud drivers covers the uses and operation of both hand and power models. Driving and removing studs of any standard or special thread form is illustrated, showing how the tool will drive and extract any stud without marring the stud's threads or mushrooming its end. Detailed instructions explain how to regulate the stud driver, how to drive and extract studs, and how to remove them from the driver. *Heli-Coil Corp.*

For free copy insert No. 12 on postcard, p. 37.

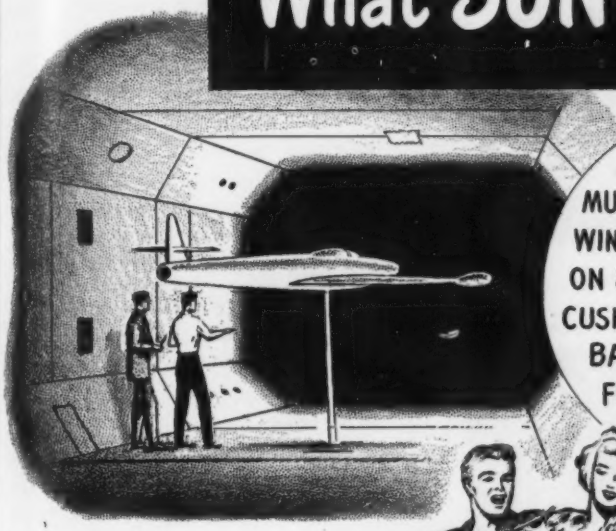
Die Casting Data

A new booklet on die castings—their advantages, how they are made, how they should be designed—provides basic information and help to anyone who has anything to do with die castings; it also contains essential technical information for designers and engineers. Steps in the manufacture of die castings are pictured, and the booklet includes information on draft, tolerance, wall thickness and core size requirements, tables of chemical and physical specifications for alloys, and a production timetable. *Die Castings Div., Hoover Co.*

For free copy insert No. 13 on postcard, p. 37.

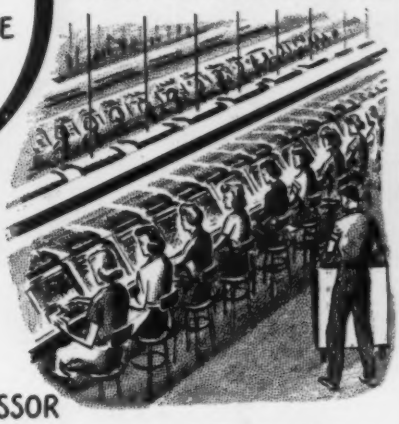
Resume Your Reading on Page 37

What SUN has done for others...



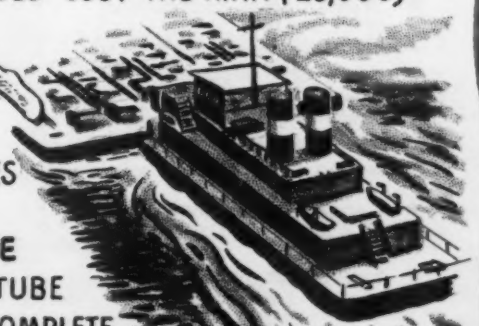
STRATEGIC MULTI-MILLION-DOLLAR WIND TUNNEL DEPENDS ON **SUNVIS** TO OIL-CUSHION THE SENSITIVE BALANCE SYSTEM FOR MEASURING STRESSES

MANUFACTURER OF BUSINESS MACHINES COATS FACTORY AIR SUPPLY FILTERS WITH **SUNTAC**-IMPROVES PURIFICATION BY 50%



SUNISO IN THE COMPRESSOR ASSURES ICE FOR MAJOR SPORTS ARENA (ONE REFRIGERATION FAILURE COULD COST THE RINK $25,000)

SUN CUP LC GREASE PROVES EFFECTIVE IN MAST AND HOUSING OF TV AERIALS UNDER ALL WEATHER CONDITIONS-AND UNDER TEMPERATURES FROM-20° TO+150°



RIVER TOWBOAT SWITCHES FROM OIL TO **SUN ADHESIVE PRESSURE GREASE** FOR STERN-TUBE BEARINGS. RESULTS: COMPLETE SUCCESS, LONGER LIFE, BIG CUTS IN COSTS!

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Unusual problems or run-of-the-mill—thoroughly "Job Proved" products are only half the story of their solution. *The other half is correct application.* That's why it will pay you to call in a Sun industrial representative. His broad experience can mean substantial savings in your operations. Just get in touch with the nearest Sun Office.

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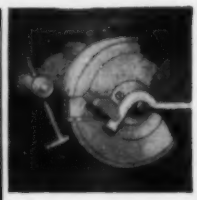
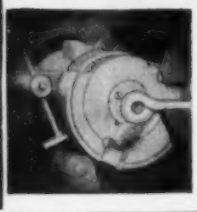
Hydraulic Eye-Bender . . .

for production shaping of small stock and forming round or oval eyes, hooks, etc.



Above
Starting bend

Below
Finished eye



- Completely new, self-contained, hydraulically operated bender
- Welded steel construction
- Hydraulic pump with direct drive, 5HP electric motor
- Footbutton control; "inching" button provided for setting dies.
- Capacity: 1" diam. stock (hot) around a 1½" mandrel
- Strokes per minute, 20

The machine described above is typical of the up-to-date, efficient machines by WILLIAMS-WHITE & CO.

Write for free information regarding this and other WILLIAMS-WHITE machines, including presses, bulldozers, punches, shears, rolls and hammers for every type of heavy production.

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production ideas

Continued from Page 40

start and stop of the work table with the advantage that the welding machine and the work table can be synchronized to start at the same time, by pushbutton control. The work table which tilts at any position about 360° rotates at infinitely variable speeds from zero

to 5 rpm with back-lash reduced to a minimum, allowing smooth, jerk-free rotation on Timken taper roller bearings. The work arm can be any length up to 16 in. An air cylinder attached to the table spindle provides that a pull-bar attached to the cylinder through the hollow spindle will clamp the workpiece to the table with advantageous speed. *Aronson Machine Co.*

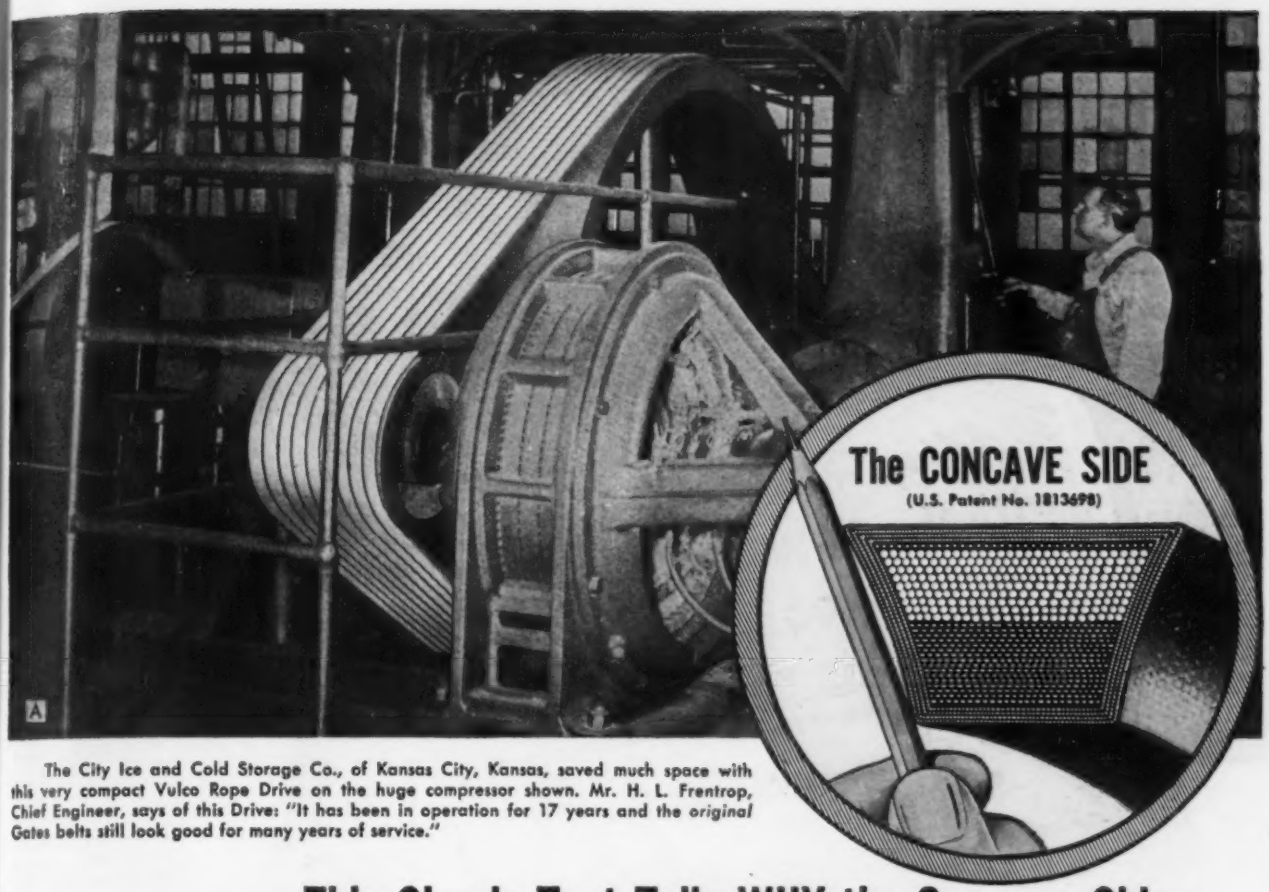
For more data insert No. 29 on postcard, p. 37.

Heat Treating Furnace

The small production type furnace with the big furnace features.

Lite-Cast refractories are used in the heat treating chamber, insuring a quick heat up for efficiency

and long life. Specifications: chamber size, 7 x 7 x 12 in.; maximum temperature, 2000°F; heat up time, 3 speeds, slow, medium and fast. Controls: indicating type of thermocouple thermometer; electronic,



The City Ice and Cold Storage Co., of Kansas City, Kansas, saved much space with this very compact Vulco Rope Drive on the huge compressor shown. Mr. H. L. Frentrop, Chief Engineer, says of this Drive: "It has been in operation for 17 years and the *original* Gates belts still look good for many years of service."

This Simple Test Tells WHY the Concave Sides of Gates Vulco Ropes Mean *Longer Belt Life!*

Prove this *yourself*—in two minutes' time.

Take any V-belt that has *straight* sides. *Bend* that V-belt while you grip its sides between your fingers and your thumb. You will *feel* the sides of the belt *bulge out*—as shown in figure 1-A, below.

Clearly, that outbulge forces the sides of the belt to press *unevenly* against the V-pulley—and this concentrates the *wear* where the bulge is greatest.

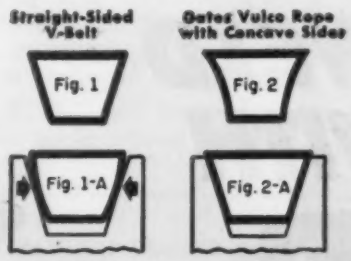
Now, make the same test with the belt that is built with the Concave Sides—the Gates Vulco Rope.

Figures 2 and 2-A show clearly what happens when you bend a Vulco Rope. Instead of *bulging*, the precisely engineered Concave Sides merely *fill out* and become perfectly straight. There is no side-bulge. This belt, when bent, precisely fits its sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure that you get the V-belt with the Concave Sides—The Gates Vulco Rope!

What Happens When a V-Belt Bends



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave-Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

CS-511

THE GATES RUBBER COMPANY
DENVER, U. S. A.
The World's Largest Makers of V-Belts

Gates VULCO ROPE DRIVES
Engineering Offices and Jobber Stocks IN ALL INDUSTRIAL CENTERS of the U. S. and 71 Foreign Countries

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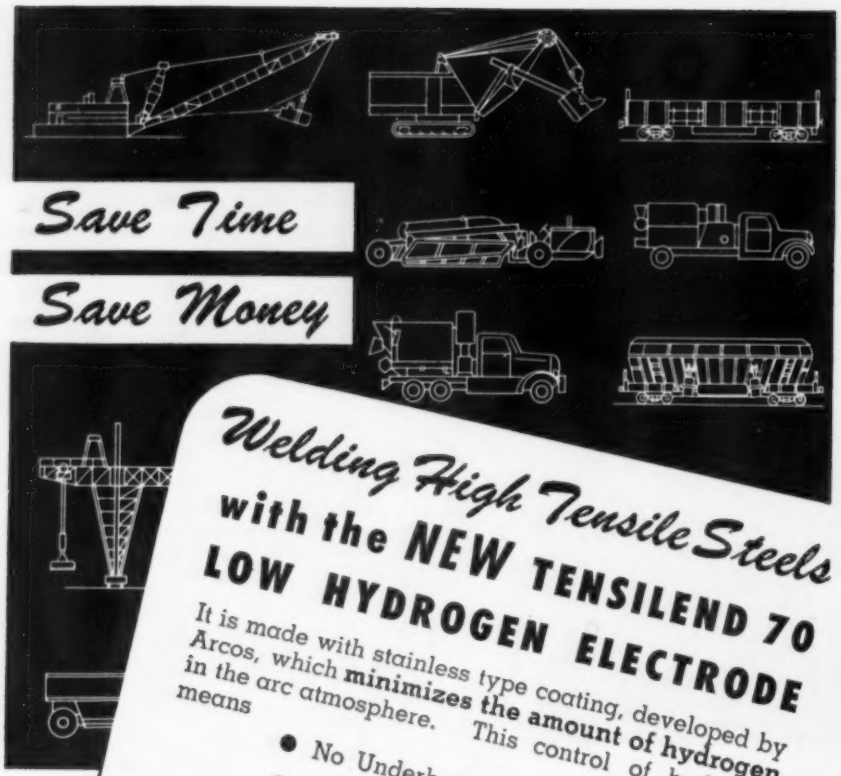


Save Time

Save Money

Welding High Tensile Steels

with the NEW TENSILEND 70

LOW HYDROGEN ELECTRODE

It is made with stainless type coating, developed by Arcos, which **minimizes the amount of hydrogen** in the arc atmosphere. This control of hydrogen means

- No Underbead Cracking
- No Preheat

Tensilend 70 can be used for welding the widest range of high strength, low alloy steels. It has proved most effective in achieving sound welds with superior physicals — high ductility and impact strength.

ARCOS CORPORATION

1500 South 50th St., Philadelphia 43, Pa.

The ABC'S of Welding High Tensile Steels

Write for "The ABC's of Welding High Tensile Steels" for helpful, technically accurate, but easy-to-read information that shows the way to better welding results.

WELD WITH

ARCOS

Specialists in Stainless, Low Alloy and Non-Ferrous Electrodes

production ideas

Continued

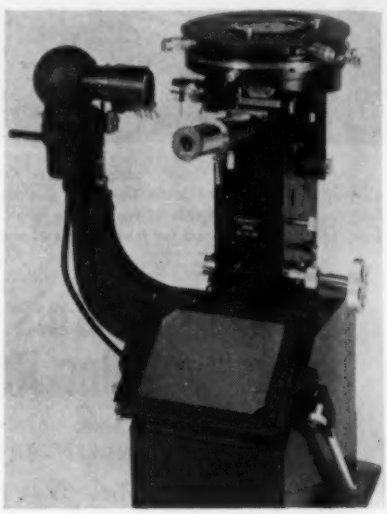
pyrometric types; gold fuse overheating control. The furnaces are made in sizes and types to specifications up to 12 x 12 x 24 in. chamber. *Monogram Products Co., Inc.*

For more data insert No. 30 on postcard, p. 37.

Camera Microscope

For metallurgical work; built-in camera; magnification 4.5 to 2200X.

Among the outstanding features of this Reichert universal camera microscope MeF are the instant changeover from bright to dark ground illumination, the instantaneous transition from visual observation to photography and from ordinary to polarized light. Methods of illumination include vertical and oblique internal having bright grounds; flat oblique multilateral and unilateral external with dark grounds. The instrument is convenient for micrography. Drawing and projection micro hardness tester accessories are available. *William J. Hacker & Co.*



For more data insert No. 31 on postcard, p. 37.

Integral HP Gear-Motors

Maximum flexibility of mounting, easy to assemble on any apparatus.

With the addition of ventilated integral hp gear-motors, the Janette line includes ventilated, enclosed, and totally enclosed fan-cooled types of gear motors. The single phase type motors are available in 1 hp and smaller ratings; polyphase and dc motors are available through 7½ hp. Integral hp, class 2 gear-

Rubber Parts...

NEW CATALOG CONTAINS DATA ON COMPOUNDS, APPLICATIONS AND FABRICATION METHODS

This 16-page, illustrated, multi-colored catalog now is available to design, production, purchasing and management personnel. This publication has been compiled to familiarize readers with Stalwart-developed rubber compounds which feature resistance to (1) abrasion, (2) chemicals, (3) high and low temperatures, (4) petroleum products and derivatives, and (5) weathering. Sections of the catalog are devoted to the new and outstanding Silicone Rubber compounds, the major methods of fabrication, and Stalwart production facilities.

More than 60 Stalwart-developed compounds are listed by code number. Charted individually in conjunction with these compounds are their physical properties and general characteristics, as well as suggested applications.

Catalog 51SR-1 will be sent upon receipt of coupon or on letterhead request.

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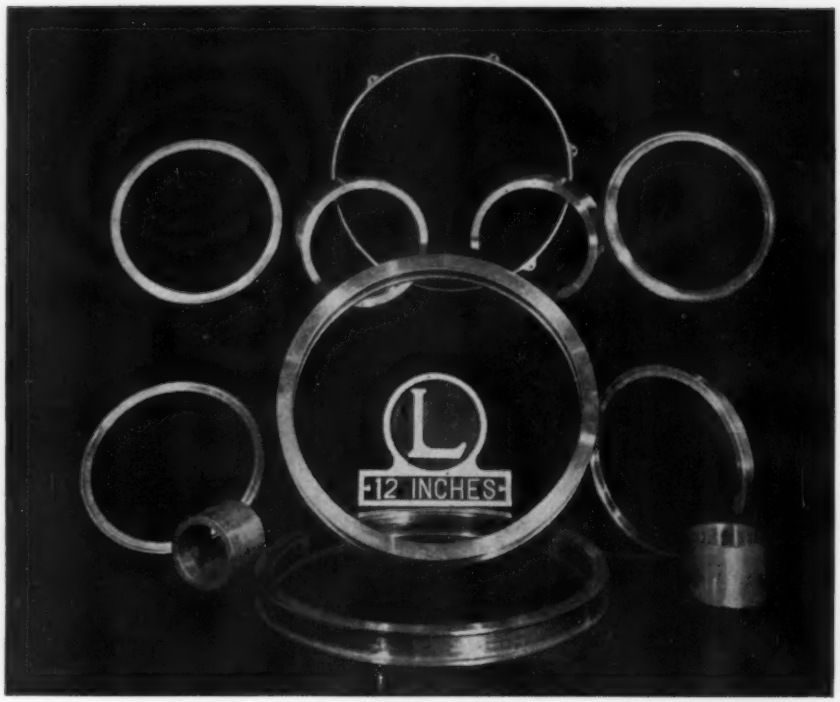
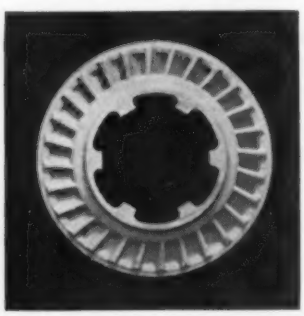


to answer the HOT question... specify LEBANON HEAT-RESISTANT Centrifugal Castings

CYLINDRICAL shapes cast in permanent molds by the exclusive Lebanon CENTRI-DIE process, are succeeding where other castings have failed. There are important reasons why Lebanon is able to produce these tough, service-proved castings with such outstanding qualities. First . . . *Lebanon experience*, covering some 39 years, has taught us how to work with difficult-to-cast heat and corrosion alloys. Second . . . *Lebanon testing* involves every proved method (including the use of a million-volt X-Ray machine) to insure absolute structural integrity. Third . . . *Lebanon exclusive processes*, like our CENTRI-DIE method of casting, were developed to give castings superior physical properties, more uniformity and to retain high resistance to many types of destructive agents. For example, today's jet engines which are subject to extremely high temperatures, depend upon Lebanon CENTRI-DIE castings. Lebanon Castings can be made to meet A.I.S.I., A.S.T.M., A.M.S., Army and Navy specifications.



Write for your copy of the Lebanon CENTRI-DIE Bulletin so that you may have, at first hand, all the facts on this important process.

LEBANON STEEL FOUNDRY • LEBANON, PA.
"In the Lebanon Valley"

Other Lebanon quality products include centrifugal castings produced in refractory molds—illustration shows a typical casting made by this process.

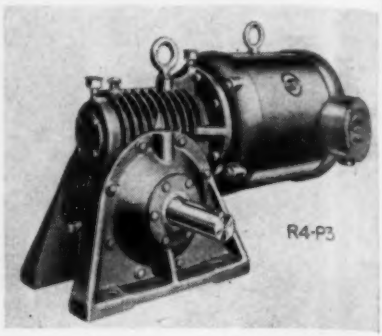
LEBANON ALLOY AND STEEL **Castings**

CIRCLE L

production ideas

Continued

motors will soon be available for use in explosive atmospheres. Six types and 16 sizes of gear boxes can be furnished with motors. Gear



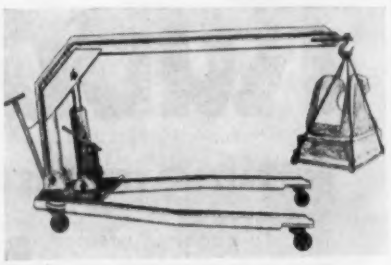
boxes include gear combination for single or double reduction, and for worm gear or combination worm-and-planetary gears. *Janette Mfg. Co.*

For more data insert No. 32 on postcard, p. 37.

Hydraulic Hoist

Makes light work of heavy lifting.

A new portable hydraulic hoist permits one man to move and handle vehicle power plants, heavy castings and equipment up to 5000 lb weight. The hoist permits getting into places inaccessible to



overhead equipment. Tracks and cranes are eliminated and alignments to a fraction of an inch are said to be possible by the hydraulically controlled boom. Loads can be raised to a height of 8½ ft. Ball bearing casters permit easy movement. *South Chester Corp.*

For more data insert No. 33 on postcard, p. 37.

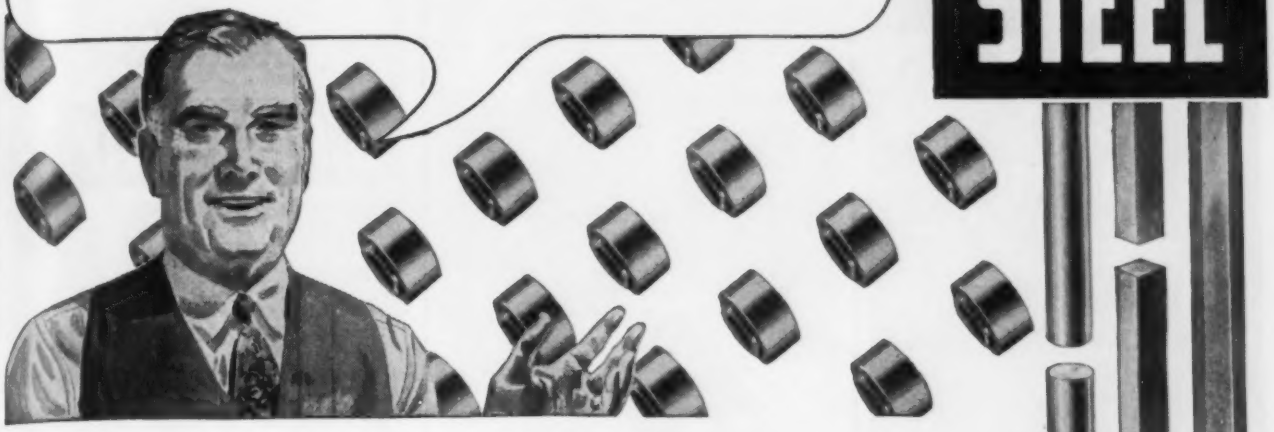
Continuous Wire Gage

Controls the amount of material the extruder places on the wire.

Designed to handle wire of any size up to 1 in. diam, the gage automatically speeds up or slows down the speed of the wire as it passes

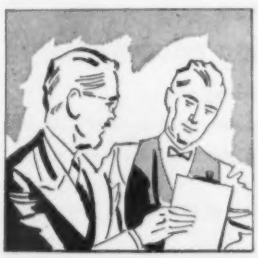
WE INCREASED PRODUCTION 71% WITH J&L "E" STEEL

J&L STEEL



(a story* about how to win customers and influence prospects)

"Got a minute? Well, let me tell you about what happened at our machine shop a couple of months ago when we first tried that new J&L "E" Steel. You wouldn't believe it was possible! (Confidentially, neither did we until we proved it to ourselves.) Here's what happened.



"We got an order to produce a big lot of plunger stops for solenoid starter switches. They're tricky to run, and you've got to be pretty careful every second. We'd read about "E" Steel in some of J&L's ads, and decided we might try some on this job.

"So we ordered some 17/32" E-33 "E" Steel stock, set up our B&S #2 and B&S #0 Automatics and began to turn out parts. We had used B-1113 for this job before and had been getting 350 pieces per hour. But we soon realized we could machine much faster with "E" Steel, and **we kept increasing speed until we were getting an average of 600 parts per hour. That's a 71% production increase!**

"Next thing we discovered was that our tools were lasting twice as long and the chips were coming off better with "E" Steel than they did with B-1113. We also found that the finish on the parts had improved from 20% to 25%.

"That's why we've been using "E" Steel. We turn out work much faster and can take on more jobs. Our men like the way "E" Steel machines and our customers get better parts and better service. Everybody benefits!"

Get your copy of the booklet titled "A Progress Report on 'E' Steel." It outlines a series of 11 case histories from machine shops that have used "E" Steel with excellent results. Write for your copy.

Based on an actual case history.

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Please send me a free copy of "A Progress Report on 'E' Steel."

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"E" Steel (U.S. Pat. No. 2,484,231) is easily identified by the distinctive blue color on the end of every bar.

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From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in OTISCOLOY *and* JALLOY *(hi-tensile steels).*

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Resistance Welding knows this symbol. In shops small and large, it means *dependability* in Tips for sound, clean welds—efficient cooling—speedy welding—long tip life—less down time—welding at a saving! WW Tips are made of alloys of correct physical and electrical properties, precision-machined, water-tight and electrically tight fitting.

Replaceable tips, both straight and offset, WW leak-proof holders, seam welding wheels, electrodes and dies and special alloys for making your own dies are available in numerous standard sizes which you will find in the WW Catalog entitled "Standard Replaceable Welding Tips—Standard Water-Cooled Holders." Weiger Weed & Company, Division of Fansteel Metallurgical Corporation, 11644 Cloverdale Avenue, Detroit 4, Michigan.

Send for this free booklet of latest information on Resistance Welding.

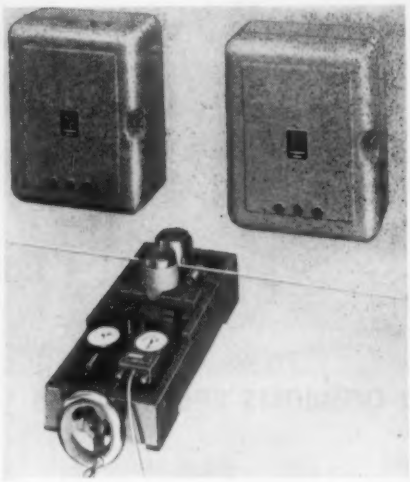
WEIGER-WEED 12801-A

Resistance Welding ELECTRODES

production ideas

Continued

through the extruder, assuring that the proper amount of insulating material is deposited to cover Underwriters' requirements. It saves material by preventing ex-



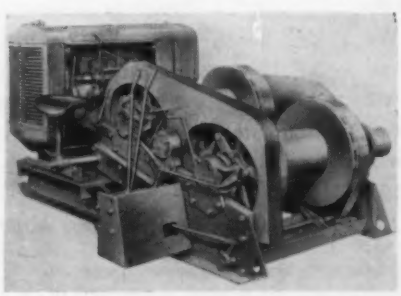
cessive amounts being deposited. The Federal Electricator is used in transferring the measurements to the speed control. The second indicator is used in setting the gage. Signal lights indicate what is going on at all times. *Federal Products Corp.*

For more data insert No. 34 on postcard, p. 37.

8000-Lb Line Pull Hoist

Safe and positive load control; economy in power consumption.

Clyde's band friction clutches enable the operator of the new hoist to handle full capacity loads with exceptional ease. Equalized linkage gives smooth and even friction



engagement and release. Outside friction surface affords better heat dissipation. Large diameter brakes permit safe and accurate load control by merely "toeing" the brake lever. Shafts rotate on ball bear-

TWA's new, fast, *all-cargo* "Sky Merchant" Fleet speeds your shipments to important markets in U. S. and overseas.

Experienced shippers know the smartest way to ship is via dependable TWA *All-cargo* "Sky Merchants."

Direct routes and connections serve more than 60 important market centers in the U. S. *All-cargo* flights overseas every week end, as well as frequent flights direct to London, Frankfurt, Paris, Zurich, Geneva, Milan, Rome.

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Make a memo—NOW—to phone TWA (Trans World Airlines) for information, rates, schedules, quick pick-up service. Request interesting folder from Cargo Sales Manager, TWA, 60 East 42nd Street, New York 17, N. Y.

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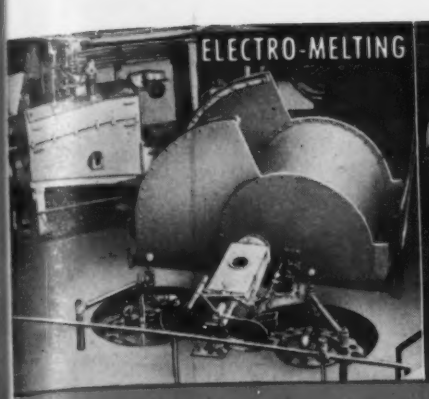

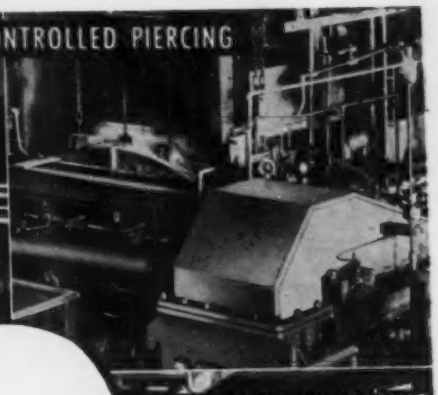

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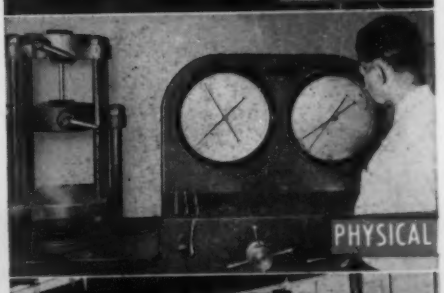

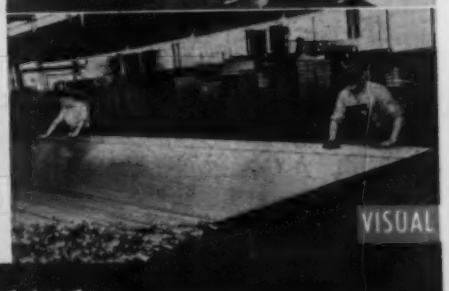

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SAVES ON PRODUCTION COSTS . .
IMPROVES QUALITY!

The illustrated steel casting was formerly made from nine hand made cores, resulting not only in slow production but loss of accuracy. So Unitcast Engineering went to work. By replacing the nine hand made cores with one unit blown core, increased production was balanced, quality improved, and all core holes on every casting were in perfect alignment. Here's just one of the many ways Unitcast facilities provide better customer service, improve the product and keep production costs competitive.

UNITCAST
Corporation
QUALITY STEEL CASTINGS

Give us a chance to offer a "cast steel" answer for your parts problem. Our suggestions while your product is in the design stage will pay continuous dividends. Write or call today. Unitcast Corporation, Steel Casting Division, Toledo 9, Ohio. *In Canada:* Canadian-Unitcast Steel, Ltd., Sherbrooke, Quebec.

UNITCASTINGS ARE FOUNDRY ENGINEERED

production ideas

Continued

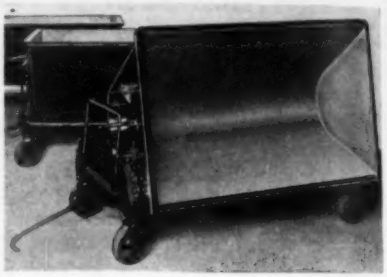
ings to provide a higher degree of hoist efficiency and economy with longer, trouble free service. These Frame-5 hoists are available with gasoline, diesel or electric power. *Clyde Iron Works, Inc.*

For more data insert No. 35 on postcard, p. 37.

Side-Dump Trucks

For use in machine shops; handle dry material—waste, parts, bulk.

The side-dump feature makes disposal of machine chips and scrap easy, eliminating shoveling and other time-consuming operations. The trucks can be drawn by hand



or powered, singly or in trains. They can also be used for temporary storage of materials. The hod is made of sheet metal, welded at the joints, and counterbalanced to render the dumping easy. Frame is structural steel; wheels, iron or rubber. Capacity is approximately 1 cu yd. *Klaas Machine & Mfg. Co.*

For more data insert No. 36 on postcard, p. 37.

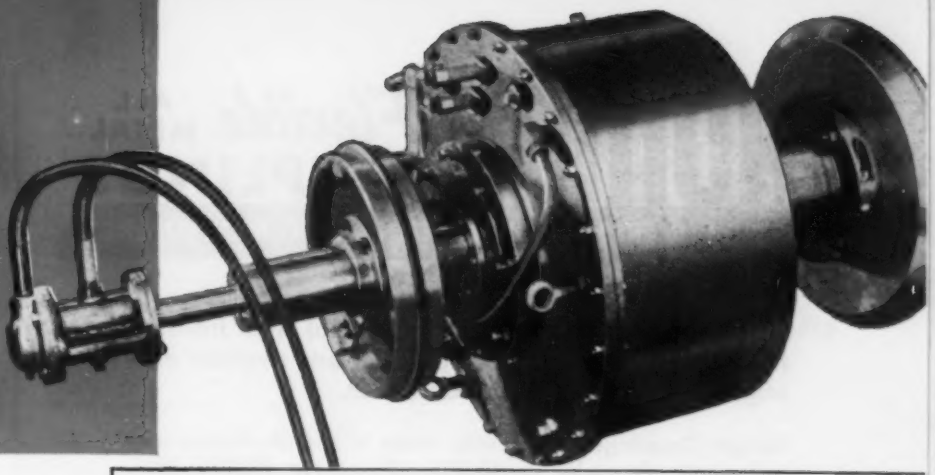
Pressure Valve

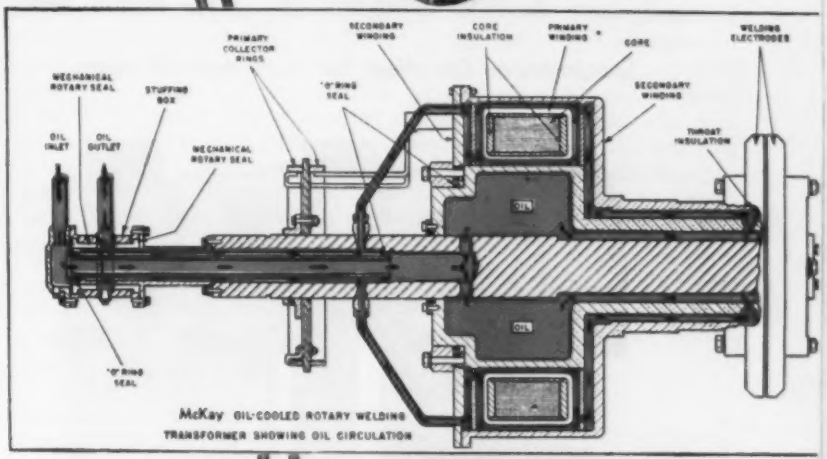
Incorporates Shear-Seal principle that gives extreme pressure control.

The Shear-Seal principle points up the fact that to shear off the fluid flow requires the least amount of effort. A pressure balanced, self-aligning, tubular valve seat keeps perfect intimate contact with the mating surface of an optically flat porting disk. Rotary movement of the disk opens and closes the flow passages. Fluid flow is always through the hole in the center of the Shear-Seal, never across sealing surfaces. The wiping and lapping action between sealing members during each operation is said to improve the sealing properties of the valve with use. Bodies are high tensile hydraulic bronze

E LAST WORD IN BE MILL DESIGN

cKay Boosts Operating Efficiency and Reduces "Down Time" with New Forced Oil Cooled Rotary Transformer





McKay OIL-COOLED ROTARY WELDING TRANSFORMER SHOWING OIL CIRCULATION

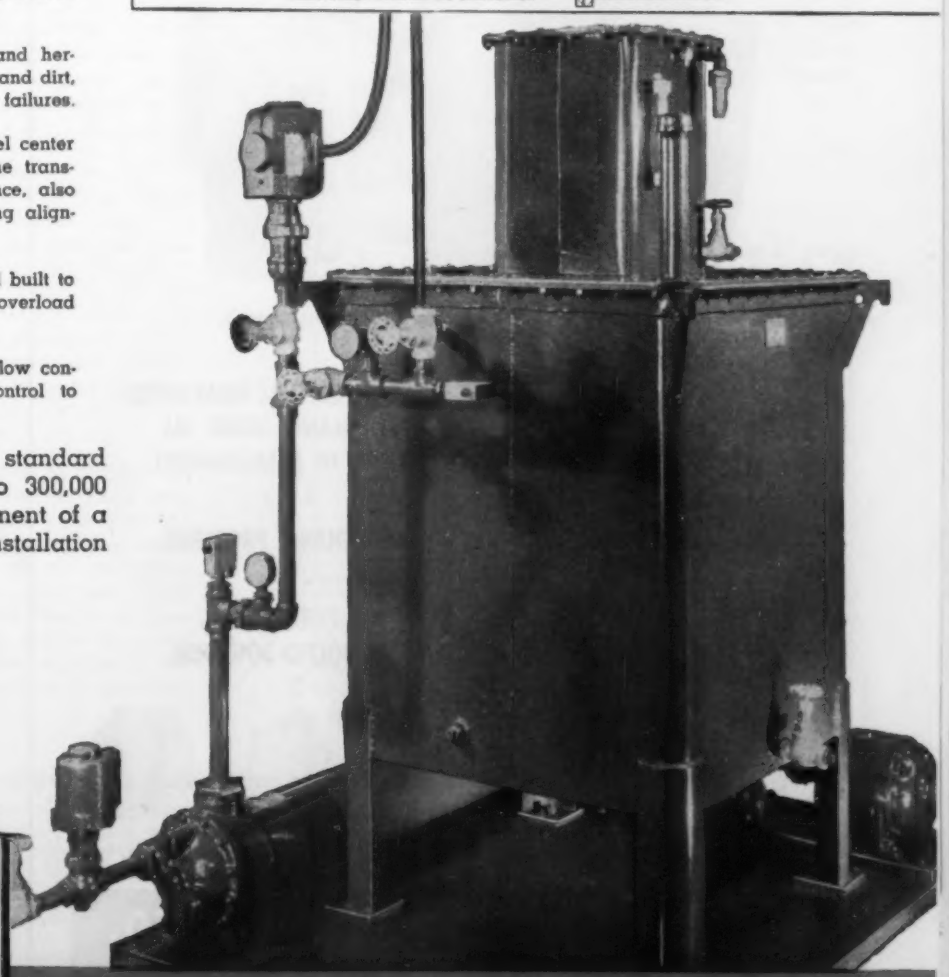
e has always been a demand for a trouble- rotary transformer for resistance weld tube McKay has recently acquired the exclusive to design and manufacture the rotary trans- r originally built under the Thomas M. ter Patents.

New Design incorporates **Forced Oil Cooling** the following advantages:

1. **Oil**, which is a non-conductor, is forced into direct contact with the high voltage primary and the inner and outer (copper) secondary castings — thereby removing heat at its source and increasing overall efficiency.
2. Entirely enclosed design of transformer and hermetically sealed oil tank exclude moisture and dirt, thereby eliminating the chief causes for failures.
3. Mechanical loads are all referred to a steel center shaft which extends the full length of the transformer, thereby maintaining perfect balance, also insuring maximum rigidity and maintaining alignment of electrodes.
4. Designed exclusively for tube mill use and built to operate at 100% duty cycle with generous overload capacity.
5. Automatic temperature control of oil and flow controls are interlocked with tube mill control to provide fool-proof operation.

rotary transformer is built in several standard s covering a range from 22,000 to 300,000 peres, and is available as a component of a plete tube mill or separately for installation existing tube mills.

rotary transformer and oil ling system is completely ered by U. S. and Foreign nts issued and pending.



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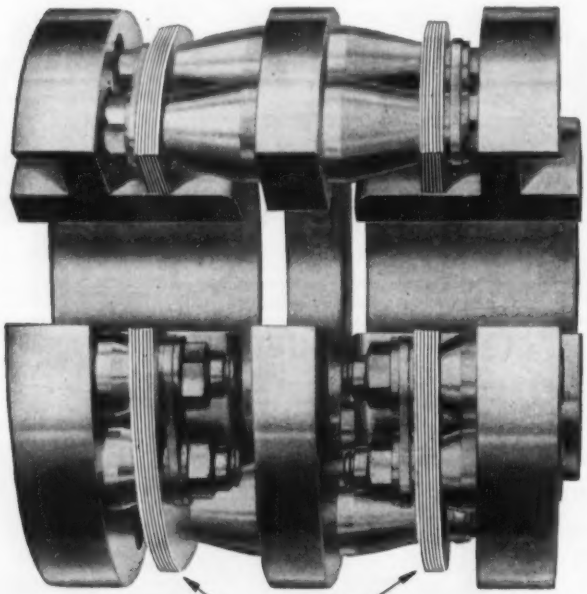
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



PATENTED FLEXIBLE DISC RINGS

BACKLASH FRICTION WEAR and CROSS-PULL are eliminated LUBRICATION IS NOT REQUIRED!

THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT.

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NO MAINTENANCE PROBLEMS.

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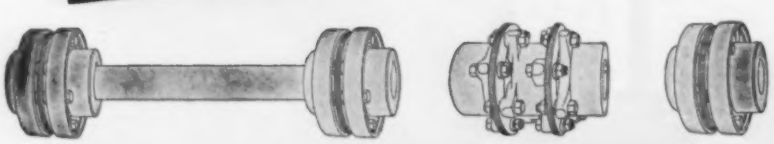
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.



Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

production ideas

Continued

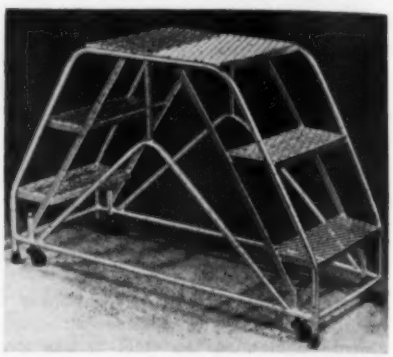
and available with regular in-line porting, straight, or manifold porting. Production models cover a complete range of types and pressures and their service ratings include all common industrial media. *Barksdale Valves.*

For more data insert No. 37 on postcard, p. 37.

Double-Step Ladders

Steps on both ends; two or more people can use ladder at one time.

When no one is on the ladder it rolls easily on swivel casters. The weight of a person, however, causes the spring mounted casters to deflect so that rubber-tipped legs engage the floor and the ladder will not roll. Frame of the ladder is welded tubular steel; steps are expanded steel. The ladder is 30 in. high x 17½ in. wide x 48 in. deep. Top step has a 20-in. tread, others have a 7-in. tread. *Ballymore Co.*



For more data insert No. 38 on postcard, p. 37.

Sealing Washers

Of fabricated compound, seals out air, dust, water and water vapor.

The washer was developed for the automobile and other industries confronted with the problem of sealing bolts, screws and other similar parts. It has strong adherence to faying surfaces, and has proved effective, it is stated, in eliminating squeaks and rattles. The washer is made in standard sizes. Inner dimensions permit it to be slipped freely over the shaft, bolt or screw. As the bolt or screw is tightened, the sealer is forced into the annular space between the bolt and the rim of the hole, effecting a water-tight seal. *Presstite Engineering Co.*

For more data insert No. 39 on postcard, p. 37.

Resume Your Reading on Page 41

IRON AGE *markets and prices*

market briefs and bulletins

higher limits on DO orders—Steel mill officials in the Midwest do not believe increases in DO limits (see story, p. 124) will change their position noticeably on extended DO orders. One mill official states that some consumers were aware of the revisions before the mill and were holding their DO's ready to put them on as soon as the order came out. In fact some consumers holding DO's called up 2 days previous to the order's issuance to place their tonnage. Mills are holding back April quotas until they can be revised. Some mills expect an additional cutback in quotas of 10 pct for April.

stainless steel—The small amount of stainless steel left over for non-rated customers is leading those in the industry to believe the mills are booking way over their DO percentages on stainless. One producer is taking on no more non-rated consumer business, except one product (hot-rolled annealed bars) until the end of the second quarter. It is not likely the mills will open their books on stainless sheet during the third quarter because of the great influx of rated orders and a considerable carryover expected from the second quarter. This comes after the mills didn't open for stainless sheet at all in the second.

super NE steels—Alloy steels containing only half as much strategic alloys as the famous NE steels have been perfected and are being produced to conserve supplies of scarce nickel, molybdenum and chrome, the American Iron & Steel Institute reported early this week. The new alloys contain an average of 0.30 pct nickel, 0.12 moly and one series contains 0.25 chrome and the other series 0.43 chrome. They also make use of boron treatment, which increases strength without reducing toughness. AISI's technical committee on alloy steel has been working on these new steels for several months because of the shortage of alloys caused by the jet program.

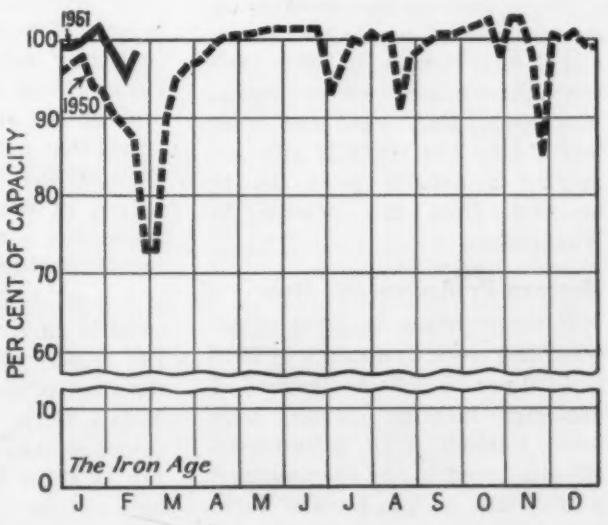
auto cutback—NPA is getting ready to restrict the amount of steel going into the auto industry. They have hinted at a cutback of as much as 40 pct. Last year the industry consumed over 15.5 million tons of finished steel, almost 22 pct of the national total. A 40 pct restriction would channel 6.2 million tons of steel to other uses. Much of the steel consumed in Detroit is cold-rolled sheet, production of which in some cases can be shifted to plate. Because of the danger of large-scale unemployment the initial restriction on auto steel will probably be considerably less than 40 pct.

back to normal—Fully recovered from the recent rail strike, U. S. Steel Co. has all 11 blast furnaces operating in South Chicago, and 11 of 12 operating at Gary. The one furnace at Gary is down for relining. Lack of cars caused by the rail strike is still being felt, but it is expected the pile-up of material at the finishing mills will be eliminated within the next several days.

substitute—Indications are that auto makers are planning to substitute paint for plating. Either aluminum or matching car paint will probably be tried. The paint may be used either with or without an overall plastic coating.

westward ho—Commercial Shearing and Stamp Co. of Chicago and Youngstown, O., will construct a $750,000 plant in Salt Lake City, on a 20-acre site in Industrial Center which it expects to have in operation by August.

Steel Operations**



District Operating Rates—Per Cent of Capacity**

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
Feb. 4	94.0*	94.2*	91.0	96.0	95.0*	104.0	22.0*	109.0*	100.0	106.0	88.2	95.1	105.0	93.0*
Feb. 11	96.0	100.5	90.0	98.0	101.7	104.0	86.5	109.0	100.0	104.0	88.0	95.1	112.6	98.5

* Revised.
** Beginning Jan. 1, 1951, operations are based on an annual capacity of 104,229,650 net tons.

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nonferrous metals

outlook and market activities

NONFERROUS METALS PRICES

	Feb. 7	Feb. 8	Feb. 9	Feb. 10	Feb. 12	Feb. 13
Copper, electro, Conn....	24.50	24.50	24.50	24.50	....	24.50
Copper, Lake delivered...	24.625	24.625	24.625	24.625	....	24.625
Tin, Straits, New York....	$1.825	$1.825	$1.825	....	....	$1.825*
Zinc, East St. Louis	17.50	17.50	17.50	17.50	....	17.50
Lead, St. Louis	16.80	16.80	16.80	16.80	....	16.80

Note: Quotations are going prices.

*Tentative.

by R.Hatschek

New York—Following the general price freeze order, nonferrous scrap dealers boosted their buying prices on many items to a level equal to or near the highest they paid during last December. Conversion deals, authorized by the National Production Authority, have warranted a price of 21½¢ per lb for No. 1 heavy copper.

Prices were revised upwards on most grades of copper and brass, nickel and Monel, tin, and various other miscellaneous grades. Aluminum, zinc, and lead were left alone. The trade is still expecting a definite price list to emanate from the powers in Washington.

Mercury Producers Ask Help

Mercury prices declined somewhat last week to a range of $216 to $220 per 76-lb flask. Owners of domestic mercury mines have been meeting with government officials recently and they suggest a price floor of 2 to 4 years' duration, so that they may be assured of adequate returns for reopening their mines.

At present, U. S. mercury production is at an extremely low ebb, reported to be the lowest level in 100 years, and the price of this commodity has been set wherever the European producers want it. The present high level was reached only after practically all domestic producers were forced out of the market by the underselling of Spanish and Italian interests.

January Output Stable

Production figures of the American Zinc Institute show January output continuing at about the same level that prevailed during the last few months of 1950. Of particular note is the fact that stocks of zinc increased from 8884 tons at the start of the year to 10,212 tons at the end of January. This is the first significant increase in over a year, although there was a minor increase during November.

A possible preview of things to come is an Army Ordnance Dept. DO rated order for 75,000 lb of titanium products from Titanium Metals Corp. of America. With prices as they are today, this will run to about $1 million. Some 60 tons of the metal were produced in 1950, but increased production will no doubt have the effect of reducing the current high costs.

Titanium Boom Coming?

It is already economically practical to use titanium in aircraft for the weight saving and the cost of a more efficient ground force will be more than paid for by the saving of lives in the field. The use and production of titanium can be expected to mushroom in these critical times.

As we go to press, the Singapore tin market is at approximately $1.91 to $1.92 per lb for April delivery. With a domestic ceiling of $1.825 (actually varying according to the individual sellers) an impossible situation has arisen and there has been no trading up to noon Tuesday. It is expected that the tin trade will appeal to the government for a solution to this problem. We continue to tentatively quote the most common ceiling price.

Wilson Asks Tariff Repeal

While brass mills are laying off workers and going to a 4-day work week and users of copper and brass mill products are yelling for relief in the copper shortage, Defense Mobilizer Charles E. Wilson got on record as being against the 2¢ tariff. It is reported that he asked the Senate Banking Committee to use its influence to have the duty repealed. Mr. Wilson contends that the copper shortage is not as acute as some people claim and that the elimination of the tax would permit the import of sufficient supplies of the vital metal.

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate: ¼ in. and heavier: 2S, 3S-F, 28.3¢ 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-T5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.142; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage 0.024 in. x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. Coiled Sheet: 0.019 in. x 28 in., 28.2¢ per lb.; 0.024 in. x 28 in., 26.9¢ per lb.

Magnesium

(F.o.b. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in. 63¢; 3/16 in. 65¢; ⅛ in. 67¢; B & S Gage 10, 68¢; 12, 72¢; 14, 78¢; 16, 85¢; 18, 93¢; 20, $1.05; 22, $1.27; 24, $1.67. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base: Up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057, ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.; Up to 1¼ in., 10,000 lb; 1¼ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheet and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	71½	57
Strip, cold-rolled	77½	60
Rods and bars	67½	55
Angles, hot-rolled	67½	55
Plates	69½	56
Seamless tubes	100½	90
Shot and blocks	....	50

Copper, Brass, Bronze

(Freight prepaid on 200 lb includes duty)

	Sheets	Rods	Extruded Shapes
Copper	41.03	....	40.63
Copper, h-r	....	36.88	....
Copper, drawn	....	38.13	....
Low brass	39.15	38.84	....
Yellow brass	38.28	37.97	....
Red brass	40.14	39.83	....
Naval brass	43.08	38.61	38.07
Leaded brass	....	32.63	36.70
Com'l bronze	41.13	40.82	....
Mang. bronze	45.96	40.65	41.41
Phos. bronze	60.20	60.45	....
Muntz metal	40.43	36.74	37.99
Ni silver, 10 pct	49.27	51.49	....
Arch. bronze	....	....	35.11

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	42.00
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.00
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.55
Cobalt, 97-99% (per lb)	$2.10 to $2.17
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	16.80
Lead, New York	17.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb	24.50
Magnesium, sticks, 100 to 500 lb	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$216-$220
Nickel, electro, f.o.b. New York	53.55
Nickel oxide sinter, f.o.b. Copper Cliff, Ont., contained nickel	46.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	90.16
Tin, New York	$1.825
Titanium, sponge	$5.00
Zinc, East St. Louis	17.50
Zinc, New York	18.22
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot	
No. 115	29.00
No. 120	28.50
No. 123	28.00
80-10-10 ingot	
No. 305	35.00
No. 315	32.00
88-10-2 ingot	
No. 210	46.25
No. 215	43.25
No. 245	36.00
Yellow ingot	
No. 405	25.00
Manganese bronze	
No. 421	29.75

Aluminum Ingot

(Cents per lb, 30,000 lb lots)

95-5 aluminum-silicon alloys	
0.30 copper, max.	33.25-34.25
0.60 copper, max.	33.00-34.00
Piston alloys (No. 122 type)	30.50-31.00
No. 12 alum. (No. 2 grade)	30.00-30.50
108 alloy	30.25-30.75
195 alloy	31.25-31.75
13 alloy	33.50-34.00
ASX-679	30.50-31.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	32.00-32.50
Grade 2—92-95%	30.25-30.75
Grade 3—90-92%	29.25-29.75
Grade 4—85-90%	28.75-29.25

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	39⅛
Electrodeposited	33¾
Rolled, oval, straight, delivered	38⅞
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball anodes	25½
Nickel 99 pct plus	
Cast	70.50
Rolled, depolarized	71.50
Cadmium	$2.80
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	79½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	52.15
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver syanide, 100 oz lots, per oz.	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drums	45.85

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	23	22¼
Yellow Brass	20½	18¾
Red brass	21½	20¾
Comm. bronze	21¾	21
Mang. bronze	19½	18⅝
Brass rod ends	19⅞	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	21.50
No. 2 copper wire	20.00
Light copper	19.00
Refinery brass	19.50*
Radiators	15.00

*Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to producer)

No. 1 copper wire	23.00
No. 2 copper wire	22.00
Light copper	21.00
No. 1 composition	22.00
No. 1 comp. turnings	21.50
Rolled brass	18.50
Brass pipe	20.50
Radiators	17.50
Heavy yellow brass	17.00

Aluminum

Mixed old cast	18½—19
Mixed new clips	20½
Mixed turnings, dry	18½
Pots and pans	18½—19
Low copper	21½—22

Dealers' Scrap

(Dealers' buying prices, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	21½
No. 2 heavy copper and wire	20
Light copper	19
New type shell cuttings	19
Auto radiators (unsweated)	15½—16
No. 1 composition	19 —19½
No. 1 composition turnings	18½—19
Clean red car boxes	17½—18
Cocks and faucets	17½—18
Mixed heavy yellow brass	14½—15
Old rolled brass	15½—16
Brass pipe	18½—19
New soft brass clippings	17½—18
Brass rod ends	16½—17
No. 1 brass rod turnings	16 —16½

Aluminum

Alum. pistons and struts	12 —13
Aluminum crankcases	15 —16
2S aluminum clippings	18½—19½
Old sheet and utensils	15 —16
Borings and turnings	12½—13
Misc. cast aluminum	15 —16
Dural clips (24S)	15 —16

Zinc

New zinc clippings	14½—15
Old zinc	11 —11⅛
Zinc routings	8½— 9
Old die cast scrap	8 — 8¼

Nickel and Monel

Pure nickel clippings	90 —100
Clean nickel turnings	80 —90
Nickel anodes	90 —100
Nickel rod ends	90 —100
New Monel clippings	30 —35
Clean Monel turnings	20 —25
Old sheet Monel	25 —30
Inconel clippings	30 —35
Nickel silver clippings, mixed	16 —18
Nickel silver turnings, mixed	15 —16

Lead

Soft scrap, lead	15 —15¼
Battery plates (dry)	8¾— 9

Magnesium

Segregated solids	9 —10
Castings	5½— 6½

Miscellaneous

Block tin	120 —125
No. 1 pewter	80 —85
No. 1 auto babbitt	75 —80
Mixed common babbitt	12¼—12½
Solder joints	23 —24
Siphon tops	75 —80
Small foundry type	18¼—18½
Monotype	16¾—17
Lino. and stereotype	16½—16¾
Electrotype	15 —15½
Hand picked type shells	11½—11¾
Lino. and stereo. dross	8¾— 9
Electro. dross	6¾— 7

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SCRAP *iron and steel*

markets
prices
trends

Scrap men seek clarification on pricing order . . . Light needed on some vague clauses and inequities . . . Market activity sags.

What the scrap trade needs is a little light on the subject of iron and steel scrap pricing. When, bit by bit, official interpretations and rulings are extracted from Washington the dead market of last week may quicken. Clarification must come quickly for capacity steel output is at stake.

The trade last week spent most of its time in interpreting the order and trying to arrive at something favorable for them. But there was too much room for doubt, and scrappies then wondered if OPS would later swat their ideas aside. Others saw only painful tidings in small print clauses and sent up a howl.

Reports of order inequities and fuzzy wording came from all scrap centers. The chief complaint in Pittsburgh was against the ban on broker-to-broker commissions and split commissions.

PITTSBURGH—The need for clarification and amendment of the scrap price control order is apparent. A rereading of the schedule has brought to light some apparent inequities and loose wording that ESA will be asked to rectify. Number one on the list is the prohibition against broker-to-broker commissions and split commissions. Some brokers say they will be seriously handicapped if the restriction is allowed to stand. The trade would also like more specific definitions on grading. Another question to be answered is whether preparation fees may be split. The preparation allowance of $2.50 for low phos is considered by many to be too low. Very little trading has been done under the new schedule. Yards were virtually swept clean in last week's rush to ship before the controlled prices became effective.

CHICAGO—Some quarters in the trade expect scrap movement during February to be slow until various points in the recent price control order are clarified. Shipments held up because of the recent rail strike started to pick up early in the week although the situation was far from normal. The bulk of material moving was that loaded before the recent control order. The problem facing members of the trade is the determination of what grades consumers will accept under the price control order and from what shipping points they will accept them.

PHILADELPHIA—Trade reaction to last week's price rollback order was generally favorable. The prices are pretty close to what was anticipated in this area. There is one question: Will openhearths be permitted to buy electric furnace scrap? It is felt that the intention was that the openhearths would not be allowed to do this but the order is not clear. A combination of the scrap order, extremely cold weather, the car shortage and the switchmen's strike contributed to a very slow week in this area. Mills are poorly supplied.

NEW YORK—Brokers here are waiting for Washington to give official interpretation to ambiguous clauses of the scrap pricing order. Meanwhile the market is sluggish after last week's bolt to ship everything but the kitchen sink before deadline time. On the limited sales going on now, some complain they don't know if prices will stand up under OPS interpretation of the order. The market will remain dull until the smoke has been cleared through OPS rulings.

DETROIT—Two situations have developed here on which interpretations are expected momentarily. By using a Cleveland base and shipping by water to Cleveland, mills in Pittsburgh and Cleveland, it appears, might pay $40.20 for scrap as compared with a $39.05, Detroit ceiling. Another issue concerns the $2 differential for electric furnace bundles. Since few local scrap sources prepare bundles 14 x 14 x 20, most of the Detroit bundles are openhearth size. However, some electric furnace buyers here have argued their bundles should be regarded as electric furnace material. The market is quiet. Weather has hindered scrap movements. Lists are expected to go under allocation late this month at ceiling prices.

CLEVELAND—One major consumer in this district was getting allocations and the market generally was breaking all records in reverse. Yards are pretty well cleaned out as a result of the feverish activity of the past month and at the moment, the market is practically inert. Foundries need tonnage and some may have to be allocated within 30 days, ac- cording to trade sources. The marke seems to be in an interim period whic may last anywhere from 2 weeks to month, during which little tonnage wi move. Biggest problem will be makin supply adequate to the demand.

ST. LOUIS—Most railroads in the St. Louis industrial district are revisin their prices on lists for which bids were submitted by brokers in accordance wit ceilings. One road has torn up all bid and is starting all over again, and con- sumers are ready to take on the scra most of them delayed buying because o the imminence of ceilings. The move- ment from the country has been sharpl curtailed for lack of cars since the strik embargo was lifted, and cold weather ha halted collections and processing.

BIRMINGHAM—The scrap market here has been fairly active since the price rol back, users who had been holding off buy ing in anticipation of such action goin back into the market to replenish stock piles, many of which were badly de pleted. Dealers are finding offerings i the Southeast plentiful and, in addition t supplying customers in the area, ar shipping to northern mills.

CINCINNATI—Trading is at low ebb here in the wake of the new scrap price schedule. Little tonnage is moving other than plant scrap which is going into dealers' yards. Foundries need tonnage but yard inventories of cast grades are reported low. The lack of activity here is not a matter of price but a hopeful ex- pectancy that some amendments will be made to the order, particularly in prep- aration charges. Little trading is ex- pected here for a month.

BOSTON—Activity in the local market was good and dealers generally expressed satisfaction with operation during the first week of controlled prices. It is gen- erally felt ceilings are fair, and all item moved at ceiling price except unstripped motor blocks which sold at $38 to $39.

BUFFALO—Interest in the scrap mar- ket here shifted from government control to a drastic shrinkage in supplies. The rail strike and sub-zero temperatures added to processing problems. Collections were off as some cars were weeks overdue at dealers' yards. Mills continue to draw on reserve stocks to maintain operations. Orders placed at the higher pre- controlled levels were carried over at the reduced prices.

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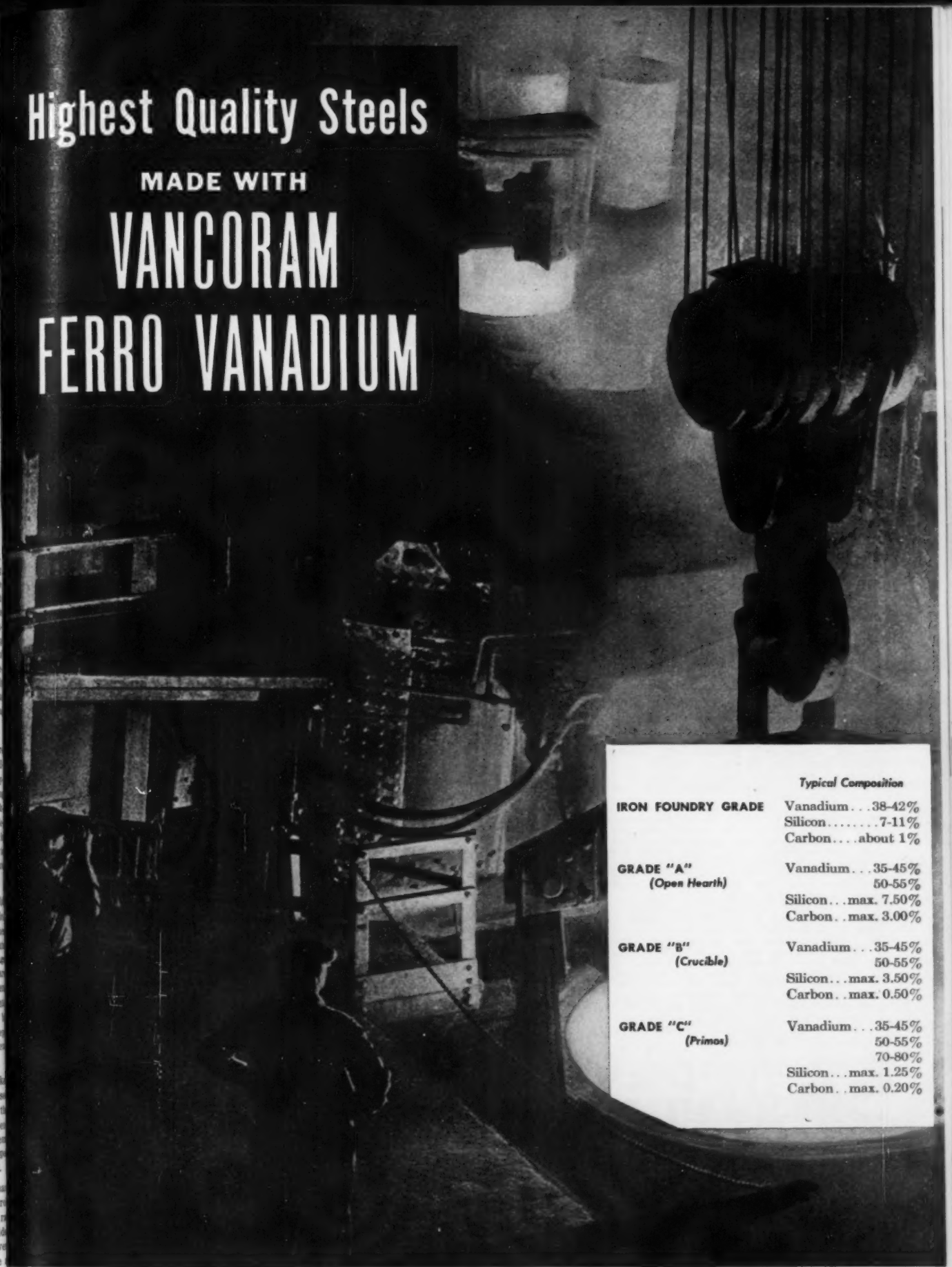

	Typical Composition
IRON FOUNDRY GRADE	Vanadium . . . 38-42% Silicon . . . . . 7-11% Carbon . . . . about 1%
GRADE "A" *(Open Hearth)*	Vanadium . . . 35-45% 50-55% Silicon . . . max. 7.50% Carbon . . max. 3.00%
GRADE "B" *(Crucible)*	Vanadium . . . 35-45% 50-55% Silicon . . . max. 3.50% Carbon . . max. 0.50%
GRADE "C" *(Primos)*	Vanadium . . . 35-45% 50-55% 70-80% Silicon . . . max. 1.25% Carbon . . max. 0.20%

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MAKERS OF FERRO-ALLOY

VANCORAM

CHEMICALS AND METALS

UNIVERSITY OF MICHIGAN LIBRARIES

Iron and Steel SCRAP PRICES

(Maximum basing point prices, per gross ton, asset by OPS, effective Feb. 7, 1951. Shipping point and delivered prices calculated as shown below.)

Switching Charge (Dollars per gross ton) →	$0.99 .75 .53 .65 .75 .51 .75	.75 .51 .51 .75 .70	.76 .83 .65 .26	1.34 .79 .50 .20 .51 .51	.20 .82 .47 .51 .51	.51	.95 .50	.78	.50 .43 .51	.33	.57	.66 .65 .82 .55
Basing Points →	Pittsburgh, Johnstown, Brackenridge, Butler, Midland, Monessen, Sharon	Youngstown, Canton, Steubenville, Warren, Weirton	Cleveland, Buffalo, Cincinnati, Middletown	Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville	Sparrows Pt., Bethlehem, Ashland, Ky., Kokomo, Ind., Portsmouth, O.	St. Louis	Detroit, Duluth	Kansas City	Birmingham, Alabama City, Atlanta	Minneapolis	Houston	Los Angeles, Pittsburg, Cal., Portland, Ore., San Francisco
GRADES												
No. 1 heavy melting	$44.00	$44.00	$43.00	$42.50	$42.00	$41.00	$40.00	$39.50	$39.00	$38.00	$37.00	$35.00
No. 2 heavy melting	42.00	42.00	41.00	40.50	40.00	39.00	38.00	37.50	37.00	36.00	35.00	33.00
No. 1 busheling	44.00	44.00	43.00	42.50	42.00	41.00	40.00	39.50	39.00	38.00	37.00	35.00
No. 1 bundles	44.00	44.00	43.00	42.50	42.00	41.00	40.00	39.50	39.00	38.00	37.00	35.00
No. 2 bundles	41.00	41.00	40.00	39.50	39.00	38.00	37.00	36.50	36.00	35.00	34.00	32.00
Machine shop turnings	34.00	34.00	33.00	32.50	32.00	31.00	30.00	29.50	29.00	28.00	27.00	25.00
Mixed borings and turnings	38.00	38.00	37.00	36.50	36.00	35.00	34.00	33.50	33.00	32.00	31.00	29.00
Shoveling turnings	38.00	38.00	37.00	36.50	36.00	35.00	34.00	33.50	33.00	32.00	31.00	29.00
Cast iron borings	38.00	38.00	37.00	36.50	36.00	35.00	34.00	33.50	33.00	32.00	31.00	29.00
No. 1 chemical borings	41.00	41.00	40.00	39.50	39.00	38.00	37.00	36.50	36.00	35.00	34.00	32.00
Forge crops	51.50	51.50	50.50	50.00	49.50	48.50	47.50	47.00	46.50	45.50	44.50	42.00
Bar crops and plate	49.00	49.00	48.00	47.50	47.00	46.00	45.00	44.50	44.00	43.00	42.00	40.00
Punchings and plate	46.50	46.50	45.50	45.00	44.50	43.50	42.50	42.00	41.50	40.50	39.50	37.50
Electric furnace bundles	46.00	46.00	45.00	44.50	44.00	43.00	42.00	41.50	41.00	40.00	39.00	37.00
Cut struct., plate, 3 ft and less	47.00	47.00	46.00	45.50	45.00	44.00	43.00	42.50	42.00	41.00	40.00	38.00
Cut struct., plate, 2 ft and less	49.00	49.00	48.00	47.50	47.00	46.00	45.00	44.50	44.00	43.00	42.00	40.00
Cut struct., plate, 1 ft and less	50.00	50.00	49.00	48.50	48.00	47.00	46.00	45.50	45.00	44.00	43.00	41.00
Heavy turnings	43.00	43.00	42.00	41.50	41.00	40.00	39.00	38.50	38.00	37.00	36.00	34.00
No. 1 RR heavy melting	46.00	46.00	45.00	44.50	44.00	43.00	42.00	41.50	41.00	40.00	39.00	37.00
Scrap rails, random lengths	48.00	48.00	47.00	46.50	46.00	45.00	44.00	43.50	43.00	42.00	41.00	39.00
Scrap rails, 3 ft and less	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.50	46.00	45.00	44.00	42.00
Scrap rails, 2 ft and less	52.00	52.00	51.00	50.50	50.00	49.00	48.00	47.50	47.00	46.00	45.00	43.00
Scrap rails, 18 in. and less	54.00	54.00	53.00	52.50	52.00	51.00	50.00	49.50	49.00	48.00	47.00	45.00
Rerolling rails	53.00	53.00	52.00	51.50	51.00	50.00	49.00	48.50	48.00	47.00	46.00	44.00
Uncut tires	48.00	48.00	47.00	46.50	46.00	45.00	44.00	43.50	43.00	42.00	41.00	39.00
Cut tires	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.50	46.00	45.00	44.00	42.00
Cut bolsters and side frames	49.00	49.00	48.00	47.50	47.00	46.00	45.00	44.50	44.00	43.00	42.00	40.00
RR specialties	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.50	46.00	45.00	44.00	42.00
Solid steel axles	58.00	58.00	57.00	56.50	56.00	55.00	54.00	53.50	53.00	52.00	51.00	49.00
No. 3 steel wheels	51.00	51.00	50.00	49.50	49.00	48.00	47.00	46.50	46.00	45.00	44.00	42.00

SWITCHING DISTRICTS—These basing points include the indicated switching districts: Pittsburgh; Bessemer, Homestead, Duquesne, Munhall. Cincinnati; Newport. St. Louis; Granite City, East St. Louis, Madison. San Francisco; South San Francisco, Niles, Oakland. Claymont; Chester. Chicago; Gary. Los Angeles; Firestone.

SHIPPING POINT PRICES (Except RR scrap)—For shipping points within basing points, the ceiling shipping point price is the basing point price, less switching charge. The ceiling for shipping points outside basing points is the basing point price yielding the highest shipping point price, less the lowest established freight charge. Dock charge, where applicable, is $1.25 per gross ton except: Memphis, 95¢; Great Lakes ports, $1.50, and New England ports, $1.75. Maximum shipping point price on No. 1 heavy melting steel in New York City is $36.99 per gross ton with set differentials for other grades. Hudson and Bergen County, N. J., shipping point prices are computed from Bethlehem basing point. All New Jersey computations use all-rail transport. Ceiling need not fall below $32 per gross ton for No. 1 heavy melting steel, with set differentials for other grades. Cast scrap shipping point prices are given in table.

DELIVERED PRICES (Except RR scrap)—Ceiling is the shipping point price plus actual freight charge, tax included. Dock charges, where applicable, are as above.

DELIVERED PRICES (RR scrap)—Ceiling on-line price of a RR operating in a basing point is the top in the highest priced basing point in which the RR operates. For off-line prices, RR's not operating in basing point, non-operating RR's, and RR scrap sold by someone other than a RR see text of order, THE IRON AGE, Feb. 8, 1951, p. 137-C.

UNPREPARED SCRAP—Maximum is $8 per gross ton less than prepared base grades (No. 1 heavy & No. 1 RR heavy). Scrap suitable for compressing into No. 1 bundles is $6 less than No. 1 bundles; suitable for compressing into No. 2 bundles, $8 less than No. 2 bundles. For cast material requiring special preparation, price is breakable cast less preparation costs.

COMMISSIONS—Brokers are permitted a maximum of $1 per gross ton commission which must be separate on the bill.

ALLOY PREMIUMS—Alloy extras are permitted on: nickel, molybdenum, manganese, silicon, and chromium. Quantities and charges may be found in the order, THE IRON AGE, Feb. 8, 1951, p. 137-D.

RESTRICTIONS ON USE—Ceiling prices on some scrap items may fluctuate with use by consumers. If some scrap is purchased for its established specialized use, the ceiling price set in the order stands. But if some special grades are purchased for other uses, the ceiling price charge shall be the price of the scrap grade being substituted. For example, the price established for Grade 28 (wrought iron) may be charged only when sold to a producer of wrought iron. Otherwise the ceiling price shall not exceed the ceiling price for the corresponding grade of basic openhearth. Restrictions on use are placed on the following grades: Chemical borings, wrought iron, rerolling rails, cupola cast, clean auto cast, and malleable. Ceiling prices on billet bloom and forge crops, alloy-free turnings, and heavy turnings may be charged only when shipped directly from industrial producer.

CEILING DELIVERED PRICES FOR TRUCK SHIPMENT OF ALL STEEL OR CAST IRON SCRAP—If delivery is made by truck public carrier, ceiling delivered price shall be the ceiling shipping point price (or in the case of railroad scrap, the pertinent ceiling on-line price) plus the actual public carrier charge. Scrap delivered by shipper or broker trucks shall have a ceiling delivered price consisting of the ceiling shipping point price (or railroad ceiling on-line price) plus the established rail carload freight rate for shipping scrap from the rail siding nearest the point of delivery. Transportation charges for delivery in a shipper or broker truck shall not exceed $4 and need not fall below $2.50.

OPS Correction on CPR 5

In F. R. Doc. 51-1937 (16 F. R. 1061), the fourth sentence of Section 23 (a) (5) reading: "May not include galvanized, vitreous enameled stock tin plate, terne plate, or other metal coated material" is corrected to read as follows: "May include galvanized, but not vitreous enameled stock tin plate, terne plate, or other metal coated material."

(s) Michael V. DiSalle
Director of
Price Stabilization

Cast Scrap

(F.o.b. all shipping points)

Cupola cast	$49.00
Charging box cast	47.00
Heavy breakable cast	45.00
Cast iron brake shoes	41.00
Stove plate	46.00
Clean auto cast	52.00
Unstripped motor blocks	43.00
Cast iron carwheels	47.00
Malleable	55.00
Drop broken machinery cast	52.00

Boston, unstripped motor blocks....$38 to $39

CEILING SHIPPING POINT, CEILING ON-LINE PRICES FOR ALL CAST IRON SCRAP—The above table shows blanket ceiling prices per gross ton for all cast iron scrap, f.o.b. shipping points.

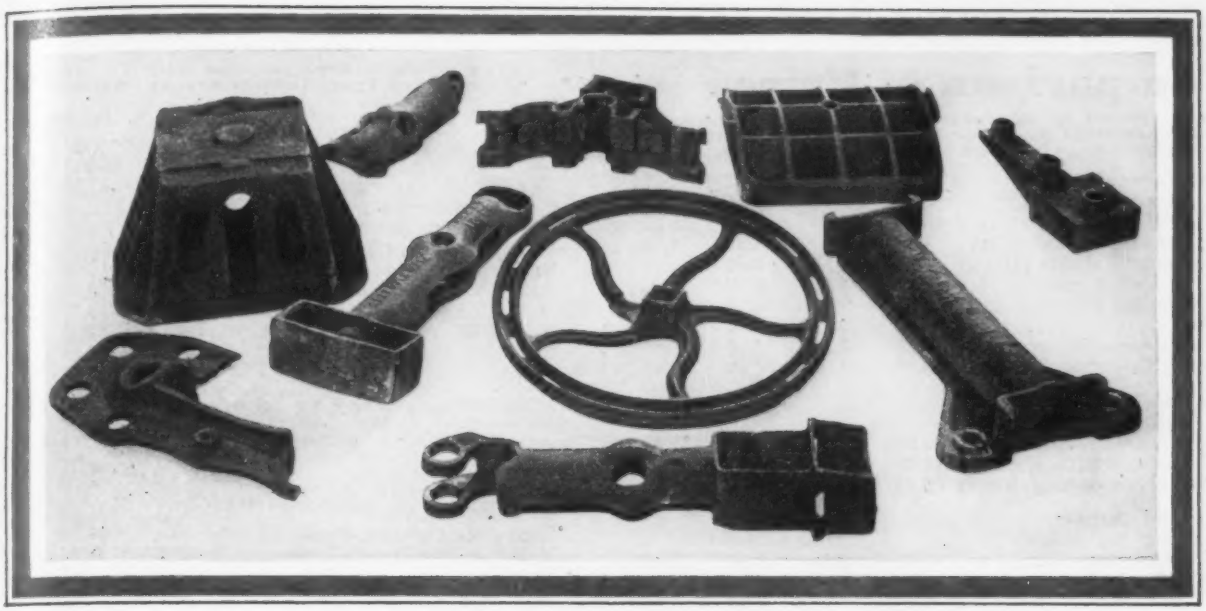
CEILING DELIVERED PRICES—The ceiling delivered price for shipment by rail, vessel, or both of dealer and industrial cast iron scrap shall be the shipping point price plus the actual transportation charges to the point of delivery. Public dock charges may be added to actual transportation charges. Where dock facilities are owned or controlled by the shipper, certain fixed charges apply. (See steel scrap footnote.)

CEILING DELIVERED PRICES FOR TRUCK SHIPMENT OF ALL STEEL OR CAST IRON SCRAP—(See steel scrap footnote).

RESTRICTIONS ON USE—(See steel scrap footnote).

CEILING INTRANSIT PREPARATION CHARGES (Dollars per gross ton)

No. 1 heavy; No. 2 heavy; No. 1 RR heavy; No. 2 RR heavy; No. 1 busheling; No. 2 bundles; electric furnace bundles	$ 8.00
No. 1 bundles; briquetted turnings or cast iron borings; No. 1 RR sheet scrap	6.00
Crushing machine shop turnings	8.00
Bar crops and plate; punchings and plate; structural and plate, 1 ft & less, and 3 ft and less; foundry steel, 1 ft & less and 2 ft & less; wrought iron	10.00
Rails, 3 ft & less; cut tires; cut bolsters & side frames	4.00
Rails, 2 ft & less	5.00
Rails, 18 in. & less	7.00



malleable scrap

use:

Malleable iron scrap is the principal ingredient used in the making of new malleable castings. These castings are very ductile and can absorb tremendous pressures or heavy hammering without fracturing.

Malleable castings have a varied range of applications and are widely used in the railroad, agricultural and automotive industries.

source:

Scrap malleable parts of automobiles, railroad cars, pipe fittings, etc.

This is one of a series illustrating the many and varied types of scrap required in the making of iron and steel for every use. Our national organization, manned by competent personnel, is ready to meet your every scrap problem.

specifications:

The scrap must be prepared to meet the physical requirements of the cupola and air furnaces, being no longer than 1/3 the diameter of the cupola. Air furnaces can use slightly larger pieces.

Malleable scrap must be free of metallic alloys, chrome and sulphur because these chemicals produce "hard spots" in the castings.

Rust is very undesirable because of its hydrogen and oxygen properties, upsetting the calculations of the metallurgist.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

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Comparison of Prices

Steel prices in this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Flat-Rolled Steel: (cents per pound)	Feb. 13, 1951	Feb. 6, 1951	Jan. 16, 1951	Feb. 14, 1950
Hot-rolled sheets	3.60	3.60	3.60	3.35
Cold-rolled sheets	4.35	4.35	4.35	4.10
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.40
Hot-rolled strip	3.50	3.50	3.50	3.25
Cold-rolled strip	4.75	4.75	4.75	4.21
Plate	3.70	3.70	3.70	3.50
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R-strip (No. 302)	36.50	36.50	36.50	33.00
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb) cokes.	$7.50	$7.50	$7.50	$7.50
Tinplate, electro (0.50 lb)	6.60	6.60	6.60	6.60
Special coated mfg. ternes	6.35	6.35	6.35	6.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.45
Cold finished bars	4.55	4.55	4.55	*4.145
Alloy bars	4.30	4.30	4.30	3.95
Structural shapes	3.65	3.65	3.65	3.40
Stainless bars (No. 302)	31.25	31.25	31.25	28.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire: (cents per pound)				
Bright wire	4.85	4.85	4.85	4.50
Rails: (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.40
Light rails	4.00	4.00	4.00	3.75
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$54.00
Slabs, rerolling	56.00	56.00	56.00	54.00
Forging billets	66.00	66.00	66.00	63.00
Alloy blooms billets, slabs	70.00	70.00	70.00	66.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	3.85
Skelp	3.35	3.35	3.35	3.15

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*

Pig Iron: (per gross ton)	Feb. 13, 1951	Feb. 6, 1951	Jan. 16, 1951	Feb. 1, 1950
No. 2 foundry, del'd Phila.	$57.77	$57.77	$57.77	$50.42
No. 2, Valley furnace	52.50	52.50	52.50	46.50
No. 2, Southern Cin'ti	55.58	55.58	55.58	49.08
No. 2, Birmingham	48.88	48.88	48.88	42.38
No. 2, foundry, Chicago†	52.50	52.50	52.50	46.50
Basic del'd Philadelphia	56.92	56.92	56.92	49.92
Basic, Valley furnace	52.00	52.00	52.00	46.00
Malleable, Chicago†	52.50	52.50	52.50	46.50
Malleable, Valley	52.50	52.50	52.50	46.50
Charcoal, Chicago	70.56	70.56	70.56	68.56
Ferromanganese‡	186.25	186.25	186.25	173.40

†The switching charge for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy page.

Scrap: (per gross ton)	Feb. 13, 1951	Feb. 6, 1951	Jan. 16, 1951	Feb. 1, 1950
Heavy melt'g steel, P'gh.	*$44.00**	$51.13	$46.13	$31.25
Heavy melt'g steel, Phila.	*42.50**	47.50	49.50	23.00
Heavy melt'g steel, Ch'go	*42.50**	44.63	44.63	27.50
No. 1 hy. com. sh't, Det.	*40.00**	40.25	40.25	23.50
Low phos. Young'n	*46.50**	54.50	48.63	31.75
No. 1 cast, Pittsburgh	*49.00†*	67.75	67.75	37.50
No. 1 cast, Philadelphia	*49.00†*	62.50	62.50	35.50
No. 1 cast, Chicago	*49.00†*	63.00	63.00	38.50

*Basing Pt. †Shipping Pt.
Not including broker's fee after Feb. 7, 1951.

Coke: Connellsville: (per net ton at oven)	Feb. 13, 1951	Feb. 6, 1951	Jan. 16, 1951	Feb. 1, 1950
Furnace coke, prompt	$14.25	$14.25	$14.25	$14.00
Foundry coke, prompt	17.25	17.25	17.25	15.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	18.50
Copper, Lake, Conn.	24.625	24.625	24.625	18.625
Tin Straits, New York	$1.825†	$1.825*	$1.75	74.50
Zinc, East St. Louis	17.50	17.50	17.50	9.75
Lead, St. Louis	16.80	16.80	16.80	11.80
Aluminum, virgin	19.00	19.00	19.00	17.00
Nickel, electrolytic	53.55	53.55	53.55	42.97
Magnesium, ingot	24.50	24.50	24.50	20.50
Antimony, Laredo, Tex.	42.00	42.00	32.00	27.25

†Tentative. *Revised.

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 130 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
Feb. 13, 1951	4.131¢ per lb.	$52.69 per gross ton	*$43.00* per gross ton
One week ago	4.131¢ per lb.	52.69 per gross ton	47.75 per gross ton
One month ago	4.131¢ per lb.	52.69 per gross ton	46.75 per gross ton
One year ago	3.837¢ per lb.	46.38 per gross ton	27.25 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	$52.69 Jan. 2	$52.69 Jan. 2	$47.75 Jan. 30	$43.00 Feb. 7
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan. 3
1949	3.837¢ Dec. 27	3.3705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	48.00 Jan. 4	19.33 June 28
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar. 9
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct. 28	29.50 May 20
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan. 1
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 22
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 24
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$19.17 Apr. 10
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr. 9
1939	2.35367¢ Jan. 3	2.26689¢ May 16	22.61 Sept. 19	20.61 Sept. 12	22.50 Oct. 3	14.08 May 16
1838	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June 7
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June 9
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June 8
1932	1.89196¢ July 5	1.83910¢ Mar. 1	14.81 Jan. 5	13.56 Dec. 6	8.50 Jan. 12	6.43 July 5
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec. 8

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

ALTER

BIG ENOUGH FOR *"BIG BUSINESS"*

–PERSONAL ENOUGH FOR *SMALL*

IRON AND STEEL

SCRAP

ALL GRADES OF

STAINLESS and ALLOY SCRAP

Cast Iron
Electric Furnace Grades
Open Hearth
Foundry Steel
Sheet Iron for Baling
Stainless Steel
Non-Ferrous Metals

Over 50 Years

ALTER

COMPANY

1700 ROCKINGHAM ROAD DAVENPORT 2, IOWA

UNIVERSITY OF MICHIGAN LIBRARIES

IRON AGE

STEEL PRICES

Smaller numbers in price boxes indicate producing companies. For main office locations, see key on facing page.
Base prices at producing points apply only to sizes and grades produced in these areas. Prices are in cents per lb unless otherwise noted. Extras apply.

	Pittsburgh	Chicago	Gary	Cleveland	Canton Massillon	Middletown	Youngstown	Bethlehem	Buffalo	Conshohocken	Johnstown	Sparrows Point	Granite City	Detroit
INGOTS Carbon forging, net ton	$52.00[1]													
Alloy, net ton	$54.00[1,17]													$54.00[31]
BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton	$56.00[1,5]	$56.00[1]	$56.00[1]						$56.00[3]		$56.00[3]			
Carbon forging billets, net ton	$66.00[1,5]	$66.00[1,4]	$66.00[1]	$66.00[4]	$66.00[4]				$66.00[3,4]	$73.00[26]	$66.00[3]			$69.00[31]
Alloy, net ton	$70.00[1,17]	$70.00[1,4]	$70.00[1]		$70.00[4]			$70.00[3]	$70.00[3,4]	$77.00[26]	$70.00[3]			$73.00[31]
PIPE SKELP	3.35[1] 3.45[5]						3.35[1,4]							
WIRE RODS	4.10[3] 4.30[16]	4.10[3,4,33]	4.10[4]	4.10[3]			4.10[6]				4.10[3]	4.20[3]		
SHEETS Hot-rolled (18 ga. & hvr.)	3.60[1,5,9,15] 3.75[28]	3.60[5,33]	3.60[1,4,5]	3.60[4]		3.60[7]	3.60[1,4,6] 4.00[13]		3.60[3]	4.00[26]		3.60[3]		3.80[13] 4.40[47]
Cold-rolled	4.35[1,5,9,15] 5.35[63]		4.35[1,5,8]	4.35[4]		4.35[7]	4.35[4,6]		4.35[3]			4.35[3]		4.55[13]
Galvanized (10 gage)	4.80[1,9,15]		4.80[1,5]		4.80[4]	4.80[7]	5.00[64]					4.80[3]		
Enameling (12 gage)	4.65[1]		4.65[1,5]			4.65[7]								
Long terne (10 gage)	5.20[9,15]						5.00[64]							
Hi str. low alloy, h.r.	5.40[1,5] 5.75[9]	5.40[1]	5.40[1,5] 5.90[5]	5.40[4]			5.40[1,4,13]		5.40[3]	5.85[26]		5.40[3]		5.95[12]
Hi str. low alloy, c.r.	6.55[1,5] 6.90[9]		6.55[1,5] 7.05[5]	6.55[4]			6.55[4]		6.55[3]			6.55[3]		7.10[12]
Hi str. low alloy, galv.	7.20[1]													
STRIP Hot-rolled	3.60[9], 4.00[41,58], 3.75[28] 3.50[5]	3.50[4,6]	3.50[1,5,8]			3.50[7]	3.50[1,4,6] 4.00[13]		3.50[3,4]	3.90[26]		3.50[3]		4.40[47] 3.8[12]
Cold-rolled	4.85[5,9] 5.00[28] 5.35[63,58]	4.90[5,64]	4.90[5]	4.65[3]		4.85[7]	4.65[4,6] 5.35[13,40]		4.85[3]			4.65[3]		4.85[12] 5.45[47] 5.80[58,61]
Hi str. low alloy, h.r.	5.75[9]		5.80[1] 5.30[5], 5.80[5]				4.95[4], 5.50[1] 5.40[13]			5.55[26]				5.95[12]
Hi str. low alloy, c.r.	7.20[9]			6.70[5]			6.20[4], 6.55[13]							
TINPLATE† Coke, 1.25-lb base box (1.50 lb. add 25¢)	$8.45[1,5,9,15]		$8.45[1,5,8]				$8.45[4]					$8.55[3]		
Electrolytic 0.25, 0.50, 0.75 lb box	0.25 lb. base box, $7.15[1,4,5,8,9]; $7.25[3,11]; $7.35[22] 0.50 lb., add 25¢; 0.75 lb. add 65¢													
BLACKPLATE, 29 gage Hollowware enameling	5.65[1] 6.15[16]		5.65[1]				5.30[4]							
BARS Carbon steel	3.70[1,5] 3.85[9]	3.70[1,4,28]	3.70[1,4,5,8]	3.70[4]	3.70[4]		3.70[1,4,6]		3.70[3,4]		3.70[3]			3.85[31]
Reinforcing‡	3.70[1,5]	3.70[4]	3.70[1,5,8]	3.70[4]			3.70[1,4]		3.70[3,4]		3.70[3]	3.70[3]		
Cold-finished	4.55[2,4,5,52,71]	4.55[3,69,70,23,73]	4.55[4,73]	4.55[2]	4.55[4,52]									4.70[64]
Alloy, hot-rolled	4.30[1,17]	4.30[1,4,28]	4.30[1,5,8]		4.30[4]		4.30[1,6]	4.30[6]	4.30[3,4]		4.30[3]			4.45[31] 4.65[12]
Alloy, cold-drawn	5.40[17,52,69,71]	5.40[4,23,69,70,73]	5.40[4] 5.90[74]		5.40[4,23]			5.40[3]	5.40[3]					5.55[64]
Hi str. low alloy, h.r.	5.55[1,5]		5.55[1,5] 6.05[5]	5.55[4]			5.55[1]	5.55[3]	5.55[3]		5.55[3]			
PLATE Carbon steel	3.70[1,5,15]	3.70[1]	3.70[1,5,8]	3.70[4] 4.00[9]			3.70[1,4] 3.95[13]		3.70[3]	4.15[26]	3.70[3]	3.70[3]		
Floor plates			4.75[8]	4.75[5]						4.75[26]				
Alloy	4.75[1]	4.75[1]	4.75[1]				5.20[13]			5.05[26]	4.75[3]	4.75[3]		
Hi str. low alloy	5.65[1,5]	5.65[1]	5.65[1,5]	5.65[4,5]			5.65[4] 5.70[13]			5.90[26]	5.65[3]	5.65[3]		
SHAPES, Structural	3.65[1,5] 3.90[9]	3.65[1,33]	3.65[1,5]					3.70[3]	3.70[3]		3.70[3]			
Hi str. low alloy	5.50[1,5]	5.50[1]	5.50[1,5]					5.50[3]	5.50[3]		5.50[3]			
MANUFACTURERS' WIRE Bright	4.85[2,5] 5.10[16]	4.85[3] 4.85		4.85[3]				Kokomo—5.80[39]			4.85[3]	4.95[3]	Duluth—4.85[3]	
PILING, Steel Sheet	4.45[1]	4.45[1]	4.45[8]						4.45[3]					

STEEL PRICES

Smaller numbers indicate producing companies. See key at right. Prices are in cents per lb unless otherwise noted. Extras apply.

Kansas City	Houston	Birmingham	WEST COAST Seattle, San Francisco, Los Angeles, Fontana		
			F=$79.00[19]		INGOTS Carbon forging, net ton
	$62.00[83]		F=$80.00[19]		Alloy, net ton
		$56.00[11]	F=$75.00[19]		BILLETS, BLOOMS, SLABS Carbon, rerolling, net ton
	$74.00[83]	$68.00[11]	F=$85.00[19] SF, LA, S=$85.00[83]		Carbon forging billets, net ton
	$78.00[83]		F=$89.00[19] LA=$90.00[83]		Alloy net ton
					PIPE SKELP
	4.50[83]	4.10[4,11]	SF=4.90[2] LA=4.90[24,62]	Worcester=4.40[8] Minnequa=4.35[14]	WIRE RODS
		3.80[4,11]	SF, LA=4.30[24] F=4.55[19]	Niles=5.25[64], Geneva=3.70[16]	SHEETS Hot-rolled (18 ga. & hvr.)
		4.35[11]	SF=5.30[24] F=5.30[19]		Cold-rolled
		4.80[4,11]	SF, LA=5.55[24]	Ashland=4.80[7]	Galvanized (10 gage)
					Enameling (12 gage)
					Long ternes (10 gage)
		5.40[11]	F=6.35[19]		Hi str. low alloy, h.r.
			F=7.50[19]		Hi str. low alloy, c.r.
					Hi str. low alloy, galv.
4.10[83]	4.90[83]	3.50[4]	SF, LA=4.25[24,62] F=4.75[19], S=4.50[62]	Atlanta=4.05[65] Minnequa=4.55[14]	STRIP Hot-rolled
			F=6.30[19] LA=6.40[27]	New Haven=5.15[3], 5.85[68]	Cold-rolled
		5.30[11]	F=6.20[19]		Hi str. low alloy, h.r.
					Hi str. low alloy, c.r.
		$8.55	SF=$9.20		TINPLATE Coke, 1.25-lb base box (1.50 lb, add 25¢)
					Electrolytic 0.25, 0.50, 0.75 lb box
					BLACKPLATE, 29 gage Hollowware enameling
4.30[83]	4.10[83]	3.70[4,11]	SF, LA=4.40[24]	Atlanta=4.25[65] Minnequa=4.15[14]	BARS Carbon steel
4.38[83]	4.10[83]	3.70[4,11]	SF, S=4.45[62] F=4.40[19], LA=4.40[83]	Atlanta=4.25[65] Minnequa=4.50[14]	Reinforcing‡
				Newark=5.00[69] Putnam=5.10[69] Hartford=5.10[4] Los Angeles=6.00[4]	Cold-finished
4.90[83]	4.70[83]		LA=5.30[62] F=5.35[19]		Alloy, hot-rolled
				Newark=5.75[69] Worcester= ‡ Hartford=5.85[4]	Alloy, cold-drawn
		5.55[11]	F=6.60[19]		Hi str. low alloy, h.r.
	4.10[83]	3.70[4,11]	F=4.30[19] S=4.60[62] Geneva=3.70[16]	Claymont=4.15[29] Coatesville=4.15[31] Minnequa=4.50[14]	PLATE Carbon steel
				Harrisburg=5.25[38]	Floor plates
			F=5.70[19] Geneva=5.65[16]	Coatesville=5.25[31] Claymont=4.85[29]	Alloy
		5.65[11]	F=6.25[19]		Hi str. low alloy
4.25[83]	4.05[83]	3.65[4,11]	SF=4.20[62] F=4.25[16] LA=4.25[24,62] S=4.30[62]	Geneva 3.65[16] Minnequa 4.10[14]	SHAPES, Structural
		50[11]	F=6.10[19]		Hi str. low alloy
5.45[83]	5.25[83]	4.85[4,11]	SF, LA=5.80[24]	Atlanta=5.10[65] Worcester=5.15[3] Minnequa=5.10[14]	MANUFACTURERS' WIRE Bright

KEY TO STEEL PRODUCERS

1 U. S. Steel Co., Pittsburgh
2 American Steel & Wire Co., Cleveland
3 Bethlehem Steel Co., Bethlehem
4 Republic Steel Corp., Cleveland
5 Jones & Laughlin Steel Corp., Pittsburgh
6 Youngstown Sheet & Tube Co., Youngstown
7 Arco Steel Corp., Middletown, Ohio
8 Inland Steel Co., Chicago
9 Weirton Steel Co., Weirton, W. Va.
10 National Tube Co., Pittsburgh
11 Tennessee Coal, Iron & R. R. Co., Birmingham
12 Great Lakes Steel Corp., Detroit
13 Sharon Steel Corp., Sharon, Pa.
14 Colorado Fuel & Iron Corp., Denver
15 Wheeling Steel Corp., Wheeling, W. Va.
16 Geneva Steel Co., Salt Lake City
17 Crucible Steel Co. of America, New York
18 Pittsburgh Steel Co., Pittsburgh
19 Kaiser Steel Corp., Oakland, Calif.
20 Portsmouth Div., Detroit Steel Corp., Detroit
21 Lukens Steel Co., Coatesville, Pa.
22 Granite City Steel Co., Granite City, Ill.
23 Wisconsin Steel Co., South Chicago, Ill.
24 Columbia Steel Co., San Francisco
25 Copperweld Steel Co., Glassport, Pa.
26 Alan Wood Steel Co., Conshohocken, Pa.
27 Calif. Cold Rolled Steel Corp., Los Angeles
28 Allegheny Ludlum Steel Corp., Pittsburgh
29 Worth Steel Co., Claymont, Del.
30 Continental Steel Corp., Kokomo, Ind.
31 Rotary Electric Steel Co., Detroit
32 Laclede Steel Co., St. Louis
33 Northwestern Steel & Wire Co., Sterling, Ill.
34 Keystone Steel & Wire Co., Peoria, Ill.
35 Central Steel & Wire Co., Harrisburg, Pa.
36 Carpenter Steel Co., Reading, Pa.
37 Eastern Stainless Steel Corp., Baltimore
38 Washington Steel Corp., Washington, Pa.
39 Jessop Steel Co., Washington, Pa.
40 Blair Strip Steel Co., New Castle, Pa.
41 Superior Steel Corp., Carnegie, Pa.
42 Timken Steel & Tube Div., Canton, Ohio
43 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
44 Reeves Steel & Mfg. Co., Dover, Ohio
45 John A. Roebling's Sons Co., Trenton, N. J.
46 Simonds Saw & Steel Co., Fitchburg, Mass.
47 McLouth Steel Corp., Detroit
48 Cold Metal Products Co., Youngstown
49 Thomas Steel Co., Warren, Ohio
50 Wilson Steel & Wire Co., Chicago
51 Sweet's Steel Co., Williamsport, Pa.
52 Superior Drawn Steel Co., Monaca, Pa.
53 Tremont Nail Co., Wareham, Mass.
54 Firth Sterling St. & Carbide Corp., McKeesport
55 Ingersoll Steel Div., Chicago
56 Phoenix Iron & Steel Co., Phoenixville, Pa.
57 Fitzsimmons Steel Co., Youngstown
58 Stanley Works, New Britain, Conn.
59 Universal-Cyclops Steel Corp., Bridgeville, Pa.
60 American Cladmetals Co., Carnegie, Pa.
61 Cuyahoga Steel & Wire Co., Cleveland
62 Bethlehem Pacific Coast Steel Corp., San Fran.
63 Follansbee Steel Corp., Pittsburgh
64 Niles Rolling Mill Co., Niles, Ohio
65 Atlantic Steel Co., Atlanta
66 Acme Steel Co., Chicago
67 Joslyn Mfg. & Supply Co., Chicago
68 Detroit Steel Corp., Detroit
69 Wycoff Steel Co., Pittsburgh
70 Bliss & Laughlin, Inc., Harvey, Ill.
71 Columbia Steel & Shafting Co., Pittsburgh
72 Cumberland Steel Co., Cumberland, Md.
73 La Salle Steel Co., Chicago
74 Monarch Steel Co., Inc., Hammond, Ind.
75 Empire Steel Co., Mansfield, Ohio
76 Mahoning Valley Steel Co., Niles, Ohio
77 Oliver Iron & Steel Co., Pittsburgh
78 Pittsburgh Screw & Bolt Co., Pittsburgh
79 Standard Forging Corp., Chicago
80 Driver Harris Co., Harrison, N. J.
81 Detroit Tube & Steel Div., Detroit
82 Reliance Div., Eaton Mfg. Co., Massillon, Ohio
83 Sheffield Steel Corp., Kansas City
84 Plymouth Steel Co., Detroit
85 Wickwire Spencer Steel, Buffalo
86 Angell Nail and Chaplet, Cleveland
87 Mid-States Steel & Wire, Crawfordsville, Ind.
88 National Supply, Pittsburgh, Pa.
89 Wheatland Tube Co., Wheatland, Pa.
90 Mercer Tube & Mfg. Co., Sharon, Pa.
91 Woodward Iron Co., Woodward, Ala.
92 Sloss-Sheffield Steel & Iron Co., Birmingham
93 Hanna Furance Corp., Detroit
94 Interlake Iron Corp., Cleveland
95 Lone Star Steel Co., Dallas
96 Mystic Iron Works, Everett, Mass.
97 Jackson Iron & Steel Co., Jackson, O.
98 Globe Iron Co., Jackson, O.
99 Pittsburgh Coke & Chemical Co., Pittsburgh
100 Shenango Furnace Co., Pittsburgh
101 Tennessee Products & Chemical Corp., Nashville
102 Koppers Co., Inc., Granite City, Ill.
103 Page Steel & Wire Div., American Chain & Cable., Monessen, Pa.

UNIVERSITY OF MICHIGAN LIBRARIES

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.00	16.50	16.00	24.25	19.75	21.50	12.75	14.75	13.00
Slabs, billets rerolling	18.50	19.75	21.75	20.75	31.75	26.00	28.25	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.00	36.50	35.50	52.50	40.00	44.50	28.00	28.50	28.50
Billets, forging	26.25	26.25	28.25	27.50	41.00	31.00	34.75	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.25	33.75	32.75	48.75	36.75	41.25	25.75	26.25	26.25
Plates	33.00	33.00	35.00	35.00	51.50	40.50	45.00	27.00	27.50	27.50
Sheets	41.00	41.00	43.00	43.00	56.50	49.00	53.50	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.00	32.25	30.00	48.25	36.75	41.00	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.50	40.00	38.50	58.50	48.00	52.00	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., 17; Brackenridge, Pa., 28; Butler, Pa., 7; McKeesport, Pa., 1; Washington, Pa., 38 (type 316 add 5¢), 39; Baltimore, 37; Middletown, Ohio, 7; Massillon, Ohio, 4; Gary, 1; Bridgeville, Pa., 59; New Castle, Ind., 55; Ft. Wayne, Ind., 67; Lockport, N. Y., 46.

Strip: Midland, Pa., 17; Cleveland, 2; Carnegie, Pa., 41; McKeesport, Pa., 54; Reading, Pa., 36; Washington, Pa., 38 (type 316 add 5¢); W. Leechburg, Pa., 28; Bridgeville, Pa., 59; Detroit, 47; Massillon, Canton, Ohio, 4; Middletown, Ohio, 7; Harrison, N. J., 80; Youngstown, 48; Lockport N. Y., 46; New Britain, Conn., 58; Sharon, Pa., 13; Butler, Pa., 7.

Bars: Baltimore, 7; Duquesne, Pa., 1; Munhall, Pa., 1; Reading, Pa., 36; Titusville, Pa., 59; Washington, Pa., 39; McKeesport, Pa., 1, 54; Bridgeville, Pa., 59; Dunkirk, N. Y., 28; Massillon, Ohio, 4; Chicago, 1; Syracuse, N. Y., 17; Watervliet, N. Y., 28; Waukegan, Ill., 2; Lockport, N. Y. 46; Canton, Ohio, 42; Ft. Wayne, Ind., 67.

Wire: Waukegan, Ill., 2; Massillon, Ohio, 4; McKeesport, Pa., 54; Bridgeport, Conn., 44; Ft. Wayne, Ind., 67; Trenton, N. J., 45; Harrison, N. J., 80; Baltimore, 7; Dunkirk, 28; Monessen, 103.

Structurals: Baltimore, 7; Massillon, Ohio, 4; Chicago, 1, 67; Watervliet, N. Y., 28; Bridgeport, Conn., 44.

Plates: Brackenridge, Pa., 28 (type 416 add ½¢); Butler, Pa., 7; Chicago, 1; Munhall, Pa., 1; Midland, Pa., 17; New Castle, Ind., 55; Lockport, N. Y., 46; Middletown, 7; Washington, Pa., 39; Cleveland, Massillon, 4.

Forged discs, die blocks, rings: Pittsburgh, 1, 17; Syracuse, 17; Ferndale, Mich., 28.

Forging billets: Midland, Pa., 17; Baltimore, 7; Washington, Pa., 39; McKeesport, 54; Massillon, Canton, Ohio, 4; Watervliet, 28; Pittsburgh, Chicago, 1.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer-1	3.60	4.00	4.70	....	....	....	....	....
Chicago-4	....	....	....	6.15	....	....	....	....
Ensley-11	3.60	4.00	....	....	....	....	....	....
Fairfield-11	....	4.00	4.40	....	....	8.60	4.50	....
Gary-1	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor-8	3.60	....	4.70	6.15	5.25	8.60	4.50	....
Johnstown-3	....	4.00	....	....	5.60	8.60	....	....
Joliet-1	....	4.00	4.70	....	....	....	....	....
Kansas City-33	....	....	....	6.40	....	....	....	....
Lackawanna-3	3.60	4.00	4.70	....	....	8.60	4.50	....
Lebanon-3	....	....	....	6.15	....	....	....	9.85
Minnequa-14	3.60	4.50	4.70	6.15	....	8.60	4.50	9.85
Pittsburgh-77	....	....	....	....	....	9.35	....	9.85
Pittsburgh-78	....	....	....	....	....	....	....	9.85
Pittsburgh-6	....	....	....	6.15	....	....	....	....
Pittsburg-24	....	....	....	....	....	....	4.65	....
Seattle-62	....	....	....	6.10	....	....	4.35	....
Steelton-3	3.60	....	4.70	....	....	....	4.50	....
Struthers-6	....	....	....	6.15	....	....	....	....
Torrance-24	....	....	....	....	....	....	4.65	....
Youngstown-4	....	....	....	6.15	....	....	....	....

Track Bolts, heat treated, to railroads, 9.85¢ per lb.

BOILER TUBES

Seamless steel, electric welded commercial boiler tubes, locomotive tubes, minimum wall, per 100 ft at mill, c.l. lots, cut lengths 10 to 24 ft.

OD gage in in.	BWG	Seamless H.R.	Seamless C.D.	Electric H.R.	Electric Weld C.D.
2	13	$22.67	$26.66	$21.99	$25.86
2½	12	30.48	35.84	29.57	34.76
3	12	33.90	39.90	32.89	34.80
3½	11	42.37	49.89	41.10	48.39
4	10	52.60	61.88	51.03	60.02

Pittsburgh Steel add, H-R: 2 in., 62¢; 2½ in., 84¢; 3 in., 92¢; 3½ in., $1.17; 4 in., $1.45. Add, C-R: 2 in., 74¢; 2½ in., 99¢; 3 in., $1.10; 3½ in., $1.37; 4 in., $1.70.

FLUORSPAR

Washed gravel fluorspar, f.o.b. cars, Rosiclare, Ill. Base price, per ton net: Effective CaF, content:

70% or more $43.00
60% or less 40.00

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 9-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Ann'ld. ¢/lb.	Merch. Wire Galv. (1) ¢/lb.
Alabama City-4	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa.-5	118	132	....	....	138	140	5.70	6.15
Atlanta-85	121	133	....	126	126	143	5.95	6.40
Bartonville-34	118	130	140	123	143	143	5.95	6.15
Buffalo-85	....	....	....	....	....	....	4.85	....
Cleveland-86	125	....	....	....	....	....	....	....
Cleveland-2	....	....	....	....	....	....	5.70	6.15
Crawfordsville-87	....	132	....	....	....	145	5.95	6.40
Donora, Pa.-2	118	130	....	123	....	140	5.70	6.15
Duluth-2	118	130	....	123	....	140	5.70	6.15
Fairfield, Ala.-11	118	130	....	123	....	136	5.70	6.15
Houston-83	126	138	....	....	....	148	6.10	6.55
Johnstown, Pa.-3	118	130	....	....	140	....	5.70	6.15
Joliet, Ill.-2	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind.-30	120	132	....	125	138	138	5.80	6.05
Los Angeles-62	....	....	....	....	....	....	6.65	....
Kansas City-83	130	130	142	135	....	152	6.30	6.75
Minnequa-14	123	138	130	128	146	146	5.95	6.45
Monessen-18	124	138	....	....	....	145	5.95	6.40
Moline, Ill.-4	....	....	136	....	....	....	....	....
Palmer-85	....	....	....	....	....	....	....	....
Pittsburg, Cal.-24	137	149	....	147	156	160	6.65	6.80
Portsmouth-20	124	137	....	....	147	147	6.10	6.60
Rankin, Pa.-2	118	130	....	....	....	140	5.70	6.15
So. Chicago, Ill.-4	118	126	140	123	....	136	5.70	5.95
S. San Fran.-14	....	....	....	147	....	160	6.65	7.10
Sparrows Pt.-3	120	....	....	125	142	142	5.80	6.25
Sterling, Ill.-33	118	130	140	123	140	140	5.70	6.15
Struthers, Ohio-6	....	....	....	....	....	....	5.70	6.15
Torrance, Cal.-24	138	....	....	....	....	....	6.65	....
Worcester-2	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa.-51	....	....	150	....	....	....	....	....

Cut Nails, carloads, base, $6.75 per 100 lb. (less 20¢ to jobbers) at Conshohocken, Pa., (26), Wareham, Mass. (53), Wheeling, W. Va., (15).

(1) Alabama City and So. Chicago do not include zinc extra.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N. Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipment; rail and water shipment less	$108.50 to $113.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD ½ in. Blk.	½ in. Gal.	¾ in. Blk.	¾ in. Gal.	1 in. Blk.	1 in. Gal.	1¼ in. Blk.	1¼ in. Gal.	1½ in. Blk.	1½ in. Gal.	2 in. Blk.	2 in. Gal.	2½-3 in. Blk.	2½-3 in. Gal.	SEAMLESS 2 in. Blk.	2 in. Gal.	2½-3 in. Blk.	2½-3 in. Gal.	3½-4 in. Blk.	3½-4 in. Gal.
STANDARD T. & C.																				
Sparrows Pt.-3	34.0	12.0	37.0	16.0	39.5	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0	....	....	....	....	....	....
Cleveland-4	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Oakland-19	25.0	3.0	28.0	7.0	30.5	10.5	31.0	21.0	31.5	22.0	32.0	12.5	32.5	13.0	....	....	....	....	....	....
Pittsburgh-5	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh-10	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
St. Louis-32	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0	....	....	....	....	....	....
Sharon-90	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0	....	....	....	....	....	....
Toledo-88	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	....	32.5	....	34.5	....
Wheeling-15	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	....	....	....	....	....	....
Wheatland-89	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG, PLAIN ENDS																				
Sparrows Pt.-3	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0	....	....	....	....	....	....
Cleveland-4	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Oakland-19	24.5	4.0	28.5	18.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0	....	....	....	....	....	....
Pittsburgh-5	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.0	15.5
Pittsburgh-10	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
St. Louis-32	34.5	14.0	38.5	18.0	40.5	21.5	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0	....	....	....	....	....	....
Sharon-90	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0	....	....	....	....	....	....
Toledo-88	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	....	33.0	....	36.5	....
Wheeling-15	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	....	....	....	....	....	....
Wheatland-89	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	....	....	....	....	....	....
Youngstown-6	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb. *(Metropolitan area delivery, add 20¢ except Birmingham, San Francisco, Cincinnati, New Orleans, St. Paul, add 15¢; Memphis, add 10¢; Philadelphia, add 25¢; New York, add 30¢).

Cities	Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	5.60	6.84	7.49[2]–8.07	6.04	.....	5.80	6.14	6.04	6.84–6.89	10.24	10.54	11.89	12.19
Birmingham*	5.60	6.40	6.75	5.55	.....	5.95	5.70	5.55	.....	.....	.....	.....	.....
Boston	6.20	7.00–7.25	7.74–8.29	6.15	8.50[4]	6.48–6.78	6.20	6.05	6.79–6.84	10.25	10.55	11.90–12.00	12.20–12.30
Buffalo	5.60	6.40	7.74–8.09	5.86	.....	6.05	5.80	5.60	6.40–6.45	10.15–10.85	10.45	11.80	11.95–12.10
Chicago	5.60	6.40	7.75	5.55	.....	5.80	5.70	5.55	6.30	9.80	10.10	11.48	11.75
Cincinnati*	5.87	6.44	7.39	5.80	.....	6.19	6.09	5.80	6.61	10.15	10.45	11.80	12.10
Cleveland	5.60	6.40	8.10	5.69	6.90	5.92	5.82	5.57	6.40	9.91	10.21	11.56	11.86
Detroit	5.78	6.53	7.89	5.94	.....	5.99	6.09	5.84	6.	10.11	10.41	11.78	12.06
Houston	7.00	8.25	.....	.....	.....	6.85	6.50	6.65	9.35	10.35	11.25	.....	12.75
Indianapolis, del'd	6.00	6.80	8.15	5.95	.....	6.20	6.10	5.95	6.80	.....	.....	.....	.....
Kansas City	6.00	6.80	7.45	6.15	7.50	6.40	6.30	6.15	7.00	10.40	10.70	12.05	12.35
Los Angeles	6.35	7.90	8.85	6.40	9.45[6]	6.40	6.35	6.35	8.20	11.30	11.30	13.20	13.50
Memphis*	6.33–6.38	7.08–7.18	.....	6.33–6.38	.....	6.43–6.02	6.33–6.48	6.08–6.33	7.16–7.32	.....	.....	.....	.....
Milwaukee	5.74	6.54	7.89	5.69–6.59	.....	5.94	5.84	5.69	6.44–6.54	9.94	10.24	11.59	11.89
New Orleans*	5.70	6.50	.....	5.75	7.25	5.95	5.75	5.75	7.30	.....	.....	.....	.....
New York*	5.67–5.97	7.19[5]–7.24[1]	8.14[2]	6.29–6.89	8.63[4]	6.28–6.58	6.10	6.12	6.99	10.05–10.15	10.35–10.45	11.70–11.80	12.10–12.20
Norfolk	6.50[3]	.....	.....	.....	.....	6.50[3]	6.60[3]	6.55[3]	.....	.....	.....	.....	.....
Philadelphia*	5.90	6.80	8.00	6.10	.....	6.05	5.90	6.05	6.86	9.90	10.20	.....	.....
Pittsburgh	5.60	6.40	7.75	5.65–5.95	.....	5.75	5.70	5.55	6.15	9.80	10.10	11.45	11.75
Portland	6.60–7.55	8.95	8.50–9.10	7.30	.....	6.80	6.95	6.90	.....	.....	12.15	.....	.....
Salt Lake City	7.95	.....	9.70–10.50[2]	8.70–8.75	.....	8.05	6.75–8.30	7.95–8.65	9.00	.....	.....	.....	.....
San Francisco*	6.65	8.05[2]	8.55–8.90[2]	6.60	9.45[6]	6.50	6.45	6.45	8.20	11.30	11.30	13.20	13.20–13.50
Seattle	7.05	8.60	9.20	9.05	.....	6.75	6.65	6.75	9.05	.....	.....	.....	.....
St. Louis	5.80–5.85	6.65	8.00	5.80	8.00[4]–8.28	6.13	6.03	5.80	6.55–6.65	10.05	10.35	11.70	12.00
St. Paul*	6.16	6.96	8.31	6.11	.....	6.36	6.26	6.11	6.96	10.36	10.66	12.01	12.31

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.
EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 400 to 1999 lb; (4) 6000 lb and over; (5) 1500 to 9999 lb.; (6) 2000 to 5999 lb.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Blast Furnace Silvery	Low Phos. Charcoal
Bethlehem-3	54.00	54.50	55.00	55.50	.....	.....	.....
Birmingham-4	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-91	48.38	48.88	.....	.....	.....	.....	.....
Birmingham-92	48.38	48.88	.....	.....	.....	.....	.....
Buffalo-4	52.00	52.50	53.00	.....	.....	.....	.....
Buffalo-93	52.00	52.50	53.00	.....	.....	63.75	.....
Chicago-94	52.00	52.50	52.50	53.00	.....	.....	.....
Cleveland-2	52.00	52.50	52.50	53.00	57.00	.....	.....
Cleveland-4	52.00	52.50	52.50	.....	.....	.....	.....
Daingerfield, Tex.-95	48.00	48.50	48.50	.....	.....	.....	.....
Duluth-94	52.00	52.50	52.50	53.00	.....	.....	.....
Erie-94	52.00	52.50	52.50	53.00	.....	.....	.....
Everett, Mass.-96	.....	53.25	53.75	.....	.....	.....	.....
Fontana-19	58.00	58.50	.....	.....	.....	.....	.....
Geneva, Utah-16	52.00	52.50	52.50	53.00	.....	.....	.....
Granite City, Ill.-102	53.90	54.40	54.90	.....	.....	.....	.....
Hubbard, O.-6	52.00	52.50	52.50	.....	.....	.....	.....
Ironton, Utah-16	52.00	52.50	.....	.....	.....	.....	.....
Jackson, O.-97,98	.....	.....	.....	.....	.....	62.50	.....
Lyle, Tenn.-101	.....	.....	.....	.....	.....	.....	66.00
Monessen-18	54.00	.....	.....	.....	.....	.....	.....
Neville Island-99	52.00	52.50	52.50	53.00	.....	.....	.....
Pittsburgh-1	52.00	.....	.....	53.00	.....	.....	.....
Sharpsville-100	52.00	52.50	52.50	53.00	.....	.....	.....
Steelton-3	54.00	54.50	55.00	55.50	60.00	.....	.....
Swedeland-26	56.00	56.50	57.00	57.50	.....	.....	.....
Toledo-94	52.00	52.50	52.50	53.00	.....	.....	.....
Troy, N. Y.-4	54.00	54.50	55.00	.....	60.00	.....	.....
Youngstown-6	52.00	52.50	52.50	53.00	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus content over 0.70 pct. Silvery iron: Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

REFRACTORIES

Fire Clay Brick

(*F.o.b. works*) *Carloads, Per* 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	85.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick

Per Net Ton

Standard chemically bonded, Balt., Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite

St. ⅜-in. grains

Domestic, f.o.b. Baltimore, in bulk fines removed	$62.70
Domestic, f.o.b. Chewelah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.00

COKE

Net Ton

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.00 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $17.50
Foundry, oven coke	
Buffalo, del'd	$25.35
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.00
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Plainesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis,	25.40
Birmingham, del'd	21.69
Neville Island	23.00

LAKE SUPERIOR ORES

(51.50% *Fe; natural content, delivered lower lake ports*)

Per gross ton

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in lake vessel rates, upper lake rail freights, dock handling charges and taxes thereon.

C-R SPRING STEEL

Base per pound f.o.b. mill

0.26 to 0.40 carbon	5.35¢
0.41 to 0.60 carbon	6.80¢
0.61 to 0.80 carbon	7.40¢
0.81 to 1.05 carbon	9.35¢
1.06 to 1.35 carbon	11.65¢

Worcester, add 0.30¢; Sharon, Carnegie, New Castle, add 0.35¢; Detroit, 0.26 to 0.40 carb., add 25¢; other grades add 15¢. New Haven, 0.26 to 0.40 carb., add 50¢; other grades add 5¢.

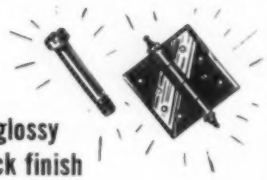
UNIVERSITY OF MICHIGAN LIBRARIES

News about

UNICHROME
Trade Mark

COATINGS for METALS

METALLIC • ORGANIC
DECORATIVE • PROTECTIVE



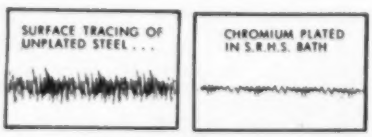
New dip produces glossy dense black finish

Newly developed Unichrome Dip for zinc offers you an unusual, dense black *metallic* finish that has all the appearance of highest quality black *enamel*. It has a uniform depth of color, good gloss. It increases the rust resistance of zinc plated steel and withstands wear. Suggested uses: As an attractive product finish to cut costs; as a corrosion inhibiting finish; as a *quality* replacement for black nickel. Write for more information. NOTE: Available in uniform olive drab, too.

Bright Finishing is no problem

Having trouble getting materials for bright finishing? Then consider this: Zinc processed in Unichrome *Clear* Dip equals more costly and scarcer finishes in appearance. It stretches supplies since it requires only about ⅓ of the plated metal required for usual bright, decorative finishes. It has superior rust resistance. And it's your best bet for *economy*.

Hard chromium plated SMOOTHER as well as faster



The unique "leveling action" of the Unichrome S.R.H.S. Chromium Solution smooths over minor surface irregularities, as the above surface traces show. Thus, not only do you save 20% to 80% plating time with this high speed bath, but also require less finishing of the plate.

UNITED CHROMIUM, INCORPORATED

100 East 42nd St., New York 17, N. Y.
Detroit 20, Mich. • Waterbury 20, Conn.
Chicago 4, Ill. • Los Angeles 13, Calif.
In Canada:
United Chromium Limited, Toronto, Ont.

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

Nuts, Hot Pressed, Cold Punched—Sq

	Pct Off List Less Keg (Reg.)	K.	Less Keg (Hvy.)	K.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	12	25	6½	21

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	39½
9/16 in. & ⅝ in.	29½	40½	22	34
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished	56—10
Packaged, plated finish	41—10
Bulk, plain finish**	67*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb.
½ in. & larger	$7.85
	Pct Off List
7/16 in. & smaller	36

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham, Lebanon, Pa.

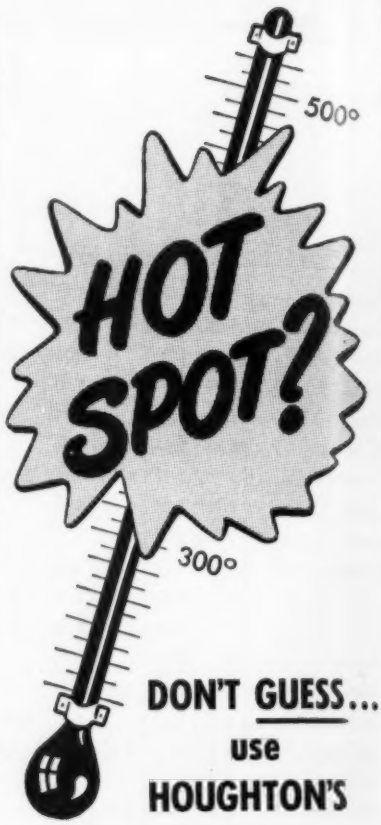
Cap and Set Screws

(In bulk)	Pct Off List
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carloads	21.60
Ton lots	23.75
Less ton lots	25.25
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carloads	27.75
Ton lots	30.05
Less ton lots	31.85



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HI-TEMP OILS

and be sure!

• Hit-or-miss hot spot lubrication is costly . . . and unnecessary. You can't afford to guess about oils that must lubricate within the critical 300°-500°F. range!

We know . . . because we made extensive on-the-job tests for two years to find which oils are best for various high temperature applications.

Take advantage of the "know-how" the Houghton man offers you. Get clean, dependable, low-cost lubrication from the *right* HI-TEMP OIL for the job!

And for actual Hi-Temp test results with proper application data, write E.F. Houghton & Co., Philadelphia 33, Pa.

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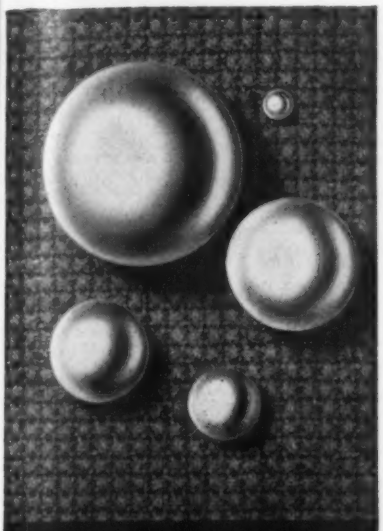
E. F. HOUGHTON & CO.
PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

a metal ball PROBLEM?



Let STROM Work It Out For You

Whether it is a precision ball bearing or one of the other many ball applications in industry, your problem will not be entirely new. Strom has been in on many ball problems and knows the importance of the right ball for the job.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity, and dependable physical quality, there's not a better ball made.

Strom STEEL BALL CO.

1850 So. 54th Ave., Cicero 50, Ill.

Largest Independent and Exclusive Metal Ball Manufacturer

ELECTRODES

Cents per lb., f.o.b. plant, threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.57
10, 12	60	8.84
8	60	9.10

CLAD STEEL

Base prices, cents per pound, f.o.b. mill

Stainless-carbon	Plate	Sheet
No. 304, 20 pct,		
Coatesville, Pa. (21)	*29.5	
Washgtn, Pa. (39)	*29.5	
Claymont, Del. (29)	*28.00	
Conshohocken, Pa. (26)		*24.00
New Castle, Ind. (55)	*26.50	*25.50
Nickel-carbon		
10 pct Coatesville (21)	32.5	
Inconel-carbon		
10 pct Coatesville (21)	40.5	
Monel-carbon		
10 pct Coatesville (21)	33.5	
No. 302 Stainless-copper-stainless, Carnegie, Pa. (60)		77.00
Aluminized steel sheets, hot dip, Butler, Pa. (7)		7.75

*Includes annealing and pickling, or sandblasting.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.235
18	4	1	—	5	$1.86
18	4	2	—	—	$1.38
1.5	4	1.5	8	—	78.5¢
6	4	2	6	—	.87¢

High-carbon chromium	63.5¢
Oil hardened manganese	35¢
Special carbon	32.5¢
Extra carbon	27¢
Regular carbon	23¢

Warehouse prices on and east of Mississippi are 3¢ per lb higher. West of Mississippi, 5¢ higher.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	9.0¢ to 15.0¢
Electrolytic iron, annealed, 99.5+% Fe	36.0¢ to 39.5¢
Electrolytic iron unallealed, minus 325 mesh, 99+% Fe	48.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe.	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	70.0¢ to $1.35
Aluminum	29.00¢
Brass, 10 ton lots	30.00¢ to 33.25¢
Copper, electrolytic	10.25¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb.	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity	$3.50
Lead	6.5¢ plus metal value
Manganese	52.00¢
Molybdenum, 99%	$2.65
Nickel, unannealed	75.5¢
Nickel, annealed	81.5¢
Nickel, spherical, unannealed	78.5¢
Silicon	34.00¢
Solder powder	6.5¢ to 8.5¢ plus met. value
Stainless steel, 302	75.00¢
Tin	11.00¢ plus metal value
Tungsten, 99%	$4.15
Zinc, 10 ton lots	20.50¢ to 23.85¢

EFFICIENT PICKLING WITH *Rodine*®

PICKLING ACID INHIBITORS

SAVES ACID
SAVES STEEL
SAVES MONEY

Use "RODINE" for improved pickling and increased production!

"RODINE" meets Government Specification No. U.S.N. 51-I-2.

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CHEMICALS ACP PROCESSES

For Improved Drawing and Cold Forming . . .

"Granodraw" forms on pickled surfaces a tightly bound adherent, zinc-iron phosphate coating which facilitates the cold extrusion of steel, improves drawing, and lengthens die life.

"Cuprodine" coats both carbon and stainless steels with a thin, bright, adherent layer of copper. This coating prolongs die life and improves the drawing of wire, rod and tubing.

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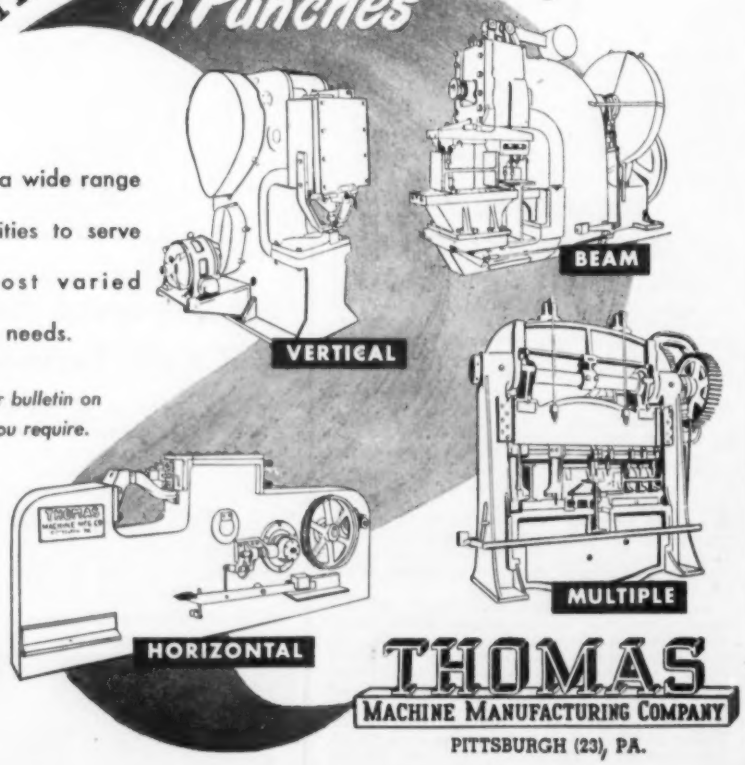
Made in a wide range of capacities to serve your most varied punching needs.

Send for bulletin on type you require.



THOMAS MACHINE MANUFACTURING COMPANY
PITTSBURGH (23), PA.

24

PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

ELECTRICAL SHEETS

22 Ga. H-R cut lengths

F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Botton-15	....	7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge-28	....	7.25	8.50	9.30	9.85	....	....
Follansbee-63	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Granite City-22	....	7.95	9.20	....	....	....	....
Ind. Harbor-3	6.75	7.25	....	....	....	....	....
Mansfield-75	6.75	7.25	8.50	9.30	....	....	....
Niles, O.-84	7.05	7.55	....	....	....	....	....
Vandergrift-1	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O.-4	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville-7	6.75	7.25	8.50	9.30	9.85	10.40	11.10

Transformer 52, 80¢ above Transformer 58.

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk, in carloads, delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si.			22.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots. 97% min. Cr, 1% max. Fe.

0.20% Max. C.	$1.09
0.50% max. C.	1.05
.00 min. C.	1.04

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.00¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.20¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump, delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.00

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50¢
Less ton lots	17.75¢

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00¢
Ton lots to carload packed	19.00¢
Less ton lots	20.50¢

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.25
Less ton lots	18.50

Simply clean surface

STEP 1

Simply apply **dy✓chek** Dye Penetrant *(by brush, spray, or dip)*

STEP 2

Simplified Non-Destructive Testing

Simply remove excess dye with **dy✓chek** Dye Remover

STEP 3

Simply apply **dy✓chek** Developer

STEP 4

New Way to INSPECT METALS

Save dollars... save time... and be sure!

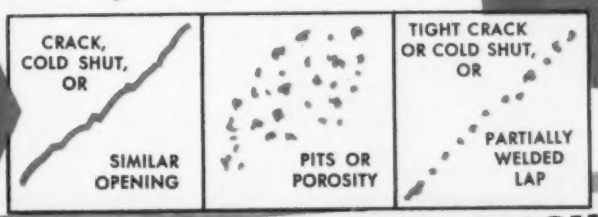
HERE ARE FACTS ON

dy✓chek TRADE-MARK

the dye penetrant inspection method

PATENT PENDING

AND... FLAWS ARE REVEALED



QUESTIONS AND ANSWERS

Q. What is Dy-Chek?

A. Dy-Chek is the revolutionary new dye penetrant method of inspection developed by *Northrop Aircraft Research.* It consists of three special liquid compounds easily applied by brush, spray, or dip.

Q. What does it do?

A. Dy-Chek reveals the location, extent, and nature of any flaw having a surface opening or discontinuity in any metal.

Q. What kind of metal surface can Dy-Chek inspect?

A. Any kind, magnetic or non-magnetic, including castings, forgings, machined parts, plate, sheet, tubing, pipe, and weldments.

Q. Are special lights required?

A. No lights, booths, electricity, or special installations are necessary.

Q. Is Dy-Chek inspection expensive?

A. Not at all. No fees or licensing is required—only the moderate cost of the special liquids. Dy-Chek materials cover large areas per gallon. Dye Remover is water-soluble, therefore water can be used freely in Step 3.

Q. Can Dy-Chek be used in the field, for preventive maintenance, as well as in a plant for manufacturing and receiving inspection?

A. Yes, the complete portability of Dy-Chek is one of its great advantages.

LEARN HOW the Dy-Chek method of non-destructive testing can save you time and money in your business. Ask for complete details today.

dy✓chek COMPANY

division of Northrop Aircraft, Inc.

1505 EAST BROADWAY
HAWTHORNE, CALIFORNIA

dy✓chek —*the dye penetrant inspection method*

Dy✓Chek Company
1505 East Broadway, Hawthorne, California

Send by return mail complete details on Dy-Chek, the Dye Penetrant Method of inspection for any metal.

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Company_____

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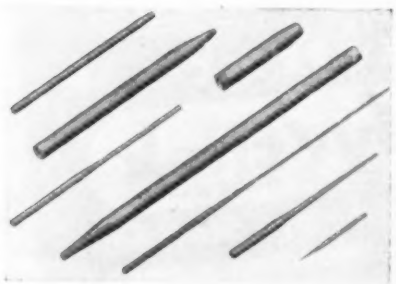

You save time and money when you rely on our high productive capacity and special equipment to turn out precision parts to your order.

Typical are surgical and dental instruments, pen and pencil barrels, soldering iron cases, etc. Medium wall tubing up to 2½" O.D. and solid steel .015" to ⅝" diameter handled.

We are also set up to make such parts as special rollers, shafts, studs, dowel pins, special needles, instrument shafts and pivots, screw driver and ice pick blades, knurled mandrels and spindles, etc.

Send your prints and specifications today for prompt quotation.

THE TORRINGTON COMPANY

Specialty Department

555 Field Street • Torrington, Conn.

Makers of

TORRINGTON NEEDLE BEARINGS

FERROALLOYS

Ferromanganese

78-82% Mn. maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Welland, Ont., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

Spiegeleisen

Contract prices gross ton, lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$74.00	$75.00
Pgh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.

Carload, packed	29.75
Ton lots	31.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb. of contained Mn. 19.15¢

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C deduct 0.2¢.

Carload bulk	9.80
Ton lots	11.45
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	11.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $89.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $83.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 1 lb Si briquets.

Carload, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered

25% Si	19.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90-95% Si			17.50

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd, Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C, 7.00% max. Si	21.25	23.10	24.30

Tinnerman Products, Inc., of Cleveland, Ohio, manufacturers of Speed Nuts, use a No. 25 Grand Rapids Hydraulic Feed Surface Grinder in their tool room. Here their Model 25 is shown grinding a combination die.

You will appreciate the micro-inch finish produced at production speeds on Grand Rapids Grinders. All Grand Rapids Hydraulic Feed Surface Grinders have these outstanding features:

1. One-piece column and base casting for vibrationless rigidity
2. Precision ball-bearing spindle which is greased for life
3. Bijur one-shot lubrication system eliminating hand oiling
4. Patented vertical movement of wheel head for quick, accurate adjustments
5. Portable coolant tank for ease of coolant replacement
6. Vane type hydraulic pump for fast longitudinal table travel

To serve you—

Your inquiry concerning your specific grinding needs will receive prompt attention. Grand Rapids Grinders include: Hydraulic Feed Surface Grinders, Universal Cutter and Tool Grinders, Hand Feed Surface Grinders, Drill Grinders, Tap Grinders, and Combination Tap and Drill Grinders.

GRAND RAPIDS GRINDERS

GALLMEYER & LIVINGSTON COMPANY

200 Straight, S. W., Grand Rapids 4, Mich.

FIRST LINE OF DEFENSE

America's Great Production Machine—once again the arsenal of democracy—runs on oil and grease. And, among buyers of industrial lubricants, Socony-Vacuum is the *first-choice supplier!* Here's why . . .

Famous Gargoyle lubricants are unsurpassed in quality—constantly improved by Socony-Vacuum research. They are backed by 85 years of lubrication experience . . . are recommended by more machine builders than the products of any other oil company. Performance records, in thousands of plants, prove they help increase production, reduce friction and power losses, lower maintenance costs.

Socony-Vacuum—with more lubrication engineers serving industry than any other oil company—can help improve production performance in *your* plant. Why not give us a call?

GARGOYLE Lubricants

SOCONY-VACUUM

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Correct Lubrication

WORLD'S GREATEST LUBRICATION KNOWLEDGE AND ENGINEERING SERVICE

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MORE FLEXIBILITY IN YOUR SHOP

Harden, heat treat, temper and anneal with one furnace . . the Johnson No. 706.

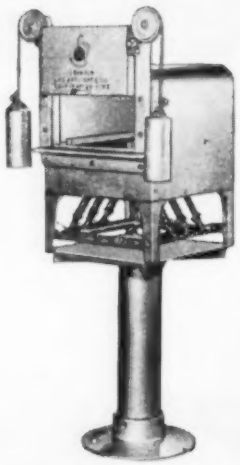
Another in the Johnson line of dependable gas equipment has won its place in both large and small shops and plants. Operators like its easy adaptability. Six Johnson Direct Jet Bunsen Burners with individual shut off valves and pilot lights provide steady, easily controlled heat from 300 to 1850° F. Semi-muffled type with burners operating below Carbofrax hearth. Firebox: 7"x 13"x 16½". Also available bench style. Write for complete and factual information.

A smaller version of this highly flexible furnace is the No. 654. Four burners deliver 300 to 1800° F. Firebox: 5" x 7¾" x 13½". Available as pedestal or bench style.

JOHNSON GAS APPLIANCE CO.
598 E Avenue, N. W., • Cedar Rapids, Iowa

Johnson No. 706 Pedestal Style $278.00
Bench Style $250.00
Johnson No. 654 Pedestal Style $150.00
Bench Style $124.00

F.O.B. Factory



Model No. 706

JOHNSON
INDUSTRIAL GAS EQUIPMENT

Furnaces • Burners • Torches • Valves • Mixers • Blowers

Why not use Perforated Metal?

This Wesix Electric Heater shows a typical application of Hendrick Perforated Metal, combining utility and attractiveness. The heater guard is 20 gauge steel, with 3/16" x 1½" side stagger perforations.

With facilities for producing any required shape and size of perforations in any commercially rolled metal, Hendrick invites inquiries from manufacturers who may be considering the use of perforated metal in connection with any of their products.

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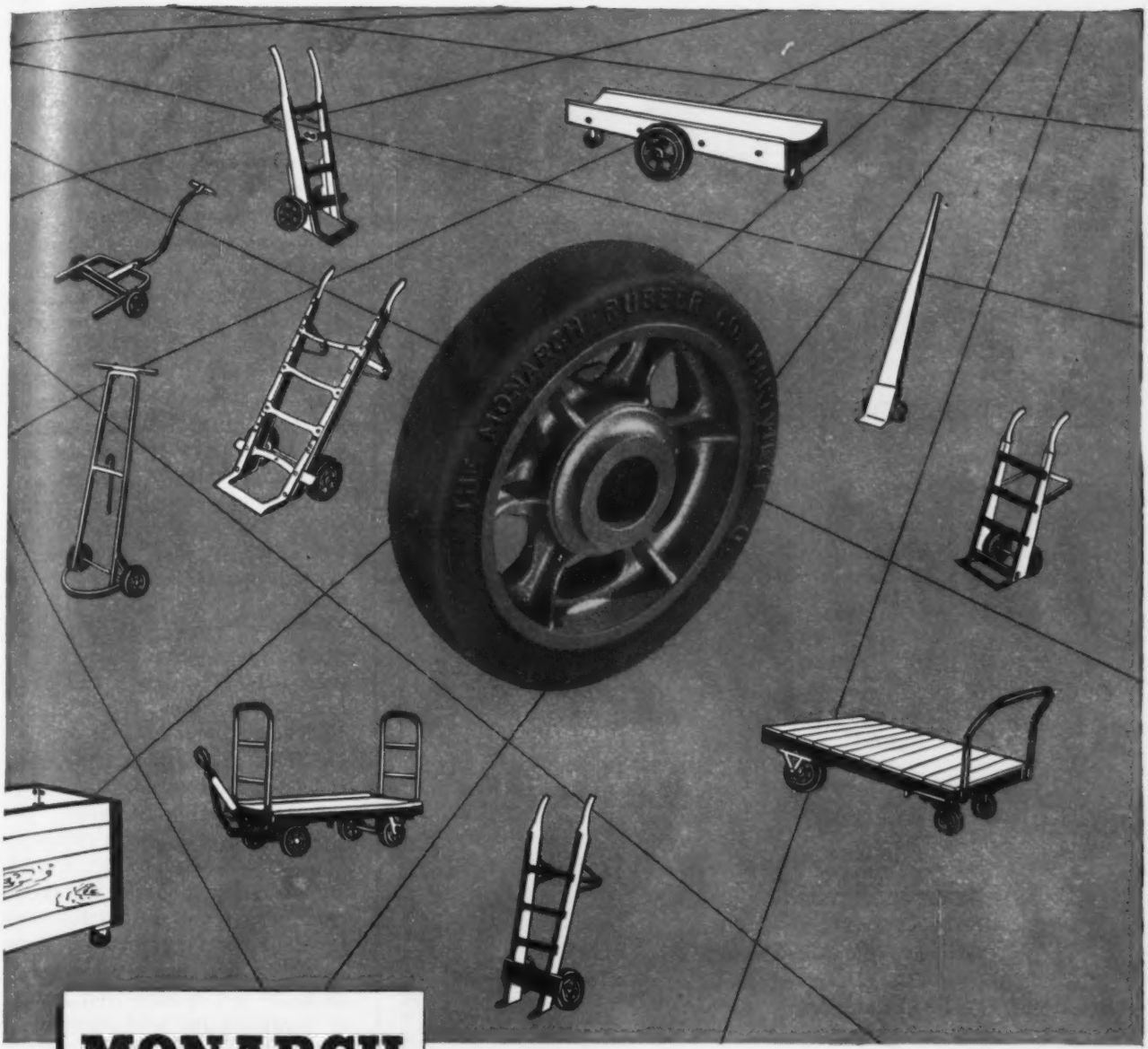
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

Other Ferroalloys

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.	
Carload	9.90¢
Ton lots	11.30¢
Calcium molybdate, 45-40%, f.o.b. Langeloth, Pa., per pound contained Mo.	$1.15
Ferrocolumbium, 50-60%, 2 in x D, contract basis, delivered, per pound contained Cb.	
Ton lots	$4.90
Less ton lots	4.95
Ferro - Tantalum - columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta	$3.75
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo	$1.32
Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton	$65.00
10 tons to less carload	75.00
Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.35
Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti	$1.50
Less ton lots	$1.55
Ferrotitanium, 15 to 19%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton	$177.00
Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W, 5 ton lots, delivered	$3.25
Ferrovanadium, 35-55%, contract basis, delivered, per pound, contained V.	
Openhearth	$3.00-$3.05
Crucible	3.10- 3.15
High speed steel (Primos)	3.25
Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa.	$1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa.	$1.13
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	
Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢
Vanadium pentoxide, 88-92% V_2O_5 contract basis, per pound contained V_2O_5	$1.28
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	
ton lots	21.00¢
Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.	
carload, bulk	7.00¢

Boron Agents

Contract prices per lb of alloy, del.	
Borosil, f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B	$5.25
Bortam, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢
Carbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.	
Ton lots, per pound	10.00¢
Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots	$1.20
F.o.b. Wash., Pa.; 100 lb, up	
10 to 14% B	.75
14 to 19% B	1.20
19% min. B	1.50
Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.	
No. 1	$1.00
No. 6	68¢
No. 79	50¢
Manganese—Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, delivered.	
Ton lots	$1.46
Less ton lots	1.57
Nickel—Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.	
Less ton lots	$1.80
Silcaz, contract basis, delivered.	
Ton lots	45.00¢



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Sweden to Make More Sponge Iron to Recapture Lost Markets

Stockholm—Sweden is planning greater production and building new sponge iron plants to fend off harmful effects of high prices of charcoal pig iron and unwanted alloys of poorer scrap metal in making its high-grade steels.

With fuel costs of charcoal iron almost double those of coke pig iron and scrap in shortage and of poorer quality, Swedish steelmakers want to recapture lost special steel markets and jack up backsliding exports of quality steels to a pre-war point of 200,000 tons per year. Now, exports are 120,000 tons a year.

Planning New Plants

New sponge iron plants are being built at Sandviken and Hellefors, while Bofors, Gagersta, and Uddeholm companies are considering joint production of the material from Toulluvaara ore. Others are also planning furnaces.

The Sandviken works brings up the problem of unwanted alloying elements in scrap by saying that they cannot use outside scrap for their special steels. For many years the firm has been charging 15 to 20 pct sponge iron instead of scrap in its acid openhearth furnaces. Soderfors and Bofors also use heavy charges of sponge and domestic scrap.

The generally-used Wiberg-Soderfors process on a run with Grangesberg concentrate will make sponge with 94.5 pct reduction. If high enough in Fe content lump ore can be used. Soderfors is now testing Venezuelan ore to determine if it is suitable for a home industry in Venezuela.

A complementary method of making sponge, the Hoganas process uses a 71.2 pct concentrate from Malmbergot and has been supplying approximately half of America's needs. Sponge iron as a substitute for a scrap and to water down alloys has been considered in the United States where the Bureau of Mines conducted tests during World War II. The report was favorable.

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NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Cause for Mystification—Washington conferences among Economic Stabilization Agency, National Production Authority, and members of the used machinery field were expected to clarify confusion as to the scope of price controls on used machines and equipment.

A survey of used machinery firms in New York last week disclosed almost complete mystification in **regard to price** controls. Some admitted that used machinery may be covered by the general control order while others stated confidently that the field was still free. Another check with the local ESA office yielded information that used machinery was covered.

Someone Who Should Know—The machine tool rebuilding field, which was lagging not too long ago, is booming to near-capacity operations, Charles A. Simmons, Sr., dean of the industry and president of the Simmons Machine Tool Corp., Albany, N. Y., told THE IRON AGE.

"The huge stocks available 90 days ago, including many held for 3 years, are gone, leaving mostly large special purpose tools on hand," said Mr. Simmons. "Six to 10 weeks is the average delivery time on rebuilding orders."

Still Some Capacity—Despite the sharp upswing caused by intense demand for equipment, machine tool rebuilders still have substantial capacity to take on new business, stated Mr. Simmons.

He continued that industry would have unlimited capacity at its disposal if the hundreds of used machinery builders who now merely paint and polish would devote their facilities to rebuilding and "thus serve industry's requirements."

Again on Prices—Mr. Simmons, who was World War II chief of the used tool division of the office of Production Management, contends that realistic price ceilings are needed immediately. He favors reemployment of the system used in World War II, with modifications to compensate fairly for rebuilt products.

Heard around the country is a rising complaint that rebuilding capacity is inadequate. Assurance of fair compensation for rebuilt products would be vital to nurturing a capable and sufficient machine rebuilding industry.

Advantages of Organization—Overall industry stands at the doorstep of fast-stepping crisis production.

There is an advantage to organization of used machinery dealers. National organizations can immediately classify them and supply important information to the government in filling defense requirements. It means that a dealer can put himself in the position of serving his country—and make certain that he will not miss any business.

Demand Spurred—Detroit demand for used machinery has picked up during recent weeks. Demand for tool room equipment is particularlly potent.

In the production fever of World War II, many sellers of used machinery set up shops "in back of the warehouse" to take on war contracts. This trend is not yet evident in Detroit but the war work rush may soon revive it.

Machine Rebuilding—This area has also seen machine rebuilding on the upswing but it is retarded by shortage of skilled manpower. Some believed that extensive layoffs from auto plants because of cutbacks would release enough men into the labor pool so that the rebuilders could grab off their share.

But makers of new tools have such large backlogs that their plants are reportedly absorbing skilled workers as soon as they leave the auto industry's door.